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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. Lorenzen, P. (1932). Untersuchungen über die Verwertbarkeit des Anfangs-, Mittel-, oder Endgemelks zur Diagnostik des gelben Galtes. [**Comparison of Fore-, Mid- and End-Milk for the Diagnosis of Streptococcus Mastitis**].—*Berl. tierärztl. Wschr.* **48.** 819-823. 2 figs., 3 tables. [6 refs.]

II. Klimmer, M., & Haupt, H. (1933). Kann der gelbe Galt durch das Melken auf gesunde Kühe übertragen werden ? [**Can Chronic Streptococcus Mastitis be transmitted to Healthy Cows by Milking ?**]—*Tierärztl. Rdsch.* **39.** 91-95. [6 refs.]

I. For the diagnosis of streptococcus mastitis in its earliest stages, i.e., when there is no clinical evidence of disease and when, presumably, the disease is confined to the sinus, it was found that the examination of fore-milk by tests such as cell count, microscopic and cultural examination and chlorine content gave the best results. When the disease was of long duration and there were clinical abnormalities in the udder and milk, the examination of fore- and end-milk gave approximately the same results.

II. The authors record the results of experiments in which attempts were made to transmit chronic streptococcus mastitis by the processes of milking by hand and by machine.

In three experiments where the ordinary hand-milking method was employed for a period of eight days, they failed to transmit the disease from an infected to a healthy cow ; in the case of one cow with two infected quarters, the infection did spread to another quarter in 14 days.

In four experiments where wet milking was practised, and the milkers' hands contaminated either with milk containing streptococci or with broth culture, the organisms became established in a quarter of one healthy cow. The same result was obtained when the teat orifice was gently rubbed against the hand containing infective material.

Results of experiments with machine milking showed that the disease was not more readily communicable by this method than by hand milking.

—S. J. Edwards.

Klimmer, M., & Haupt, H. (1932). Infektionsversuche mit Streptococcus epidemicus, Streptococcus mitior, einem Mikrokokkus aus Angina des Menschen und Streptococcus equi am Euter der Kuh. [**Infection Experiments on the Cow's Udder with** *Streptococcus epidemicus*, *Str. mitior*, **a Micrococcus from Angina in Man and** *Str. equi*].—*Tierärztl. Rdsch.* **38.** 809-812 and 828-831. 1 table. [16 refs.]

An attempt to infect the left fore-quarter of a cow in full milk, by rubbing the end of the teat on three successive days with a culture of *Str. epidemicus*, failed. A similar attempt, which was made a week later after the production of a surface wound with sand paper, also failed. Acute mastitis was, however, produced in the same quarter after another week by injection of 2 c.c. of culture through the teat canal ; this spread to the hind-quarter of the same side.

The infection experiments with *Str. mitior* and the angina micrococcus had a negative result. Injection of *Str. equi* gave rise to mastitis which also spread to the other quarter of the same side.

The author discusses the literature regarding infection of the cow's udder with streptococci which are potentially pathogenic to human beings or which

show characters similar to those of *Str. pyogenes*, and stresses the necessity of periodic examinations of milk supplies of all kinds, but particularly of graded milks, for actively haemolytic streptococci.—A. W. STABLEFORTH.

SCHMIDT-HOENSDORF, F., & SCHMIDT, W. (1932). Die galaktogene Infektion und der Einfluss des Ausmelkens auf den Verlauf der Streptokokkenmastitis. II. Mitteilung. Maschinen-melken. [**Galactogenous Infection and the Influence of Stripping on the Course of Streptococcal Mastitis. II. Machine-Milking**].—*Arch. wiss. prakt. Tierhlk.* **65.** 535-546. 2 figs., 3 tables. [5 refs.]

Enduring infection was produced in each of ten machine-milked cows by injection of cultures by way of the teat canal. The authors believe that this result, in conjunction with their earlier results on 40 hand-milked cows, makes it certain that the teat canal is the normal path of entry in streptococcal mastitis. No fundamental difference was observed between the artificial infection of hand and of machine-milked cows.

The course of the disease is nevertheless influenced by the method of milking because it is dependent upon the thoroughness with which the udder is emptied. More pronounced and sustained changes and a greater decrease in milk production were observed in machine-milked animals which were not stripped afterwards than in those which were carefully stripped, a difference similar to that observed in hand-milked cows which were or were not thoroughly stripped.

Full details are given : they show that the difference in the character of the milk was least pronounced during the first days after infection but soon became striking, although streptococci were cultivable from most quarters throughout the period of observation.—A. W. STABLEFORTH.

HUCKER, G. J. (1933). **The Laboratory Detection of Bovine Mastitis.**—*New York State Agric. Expt. Sta. Bull.* No. 626. pp. 24. 6 figs., 2 plates. [18 refs.]

The author discusses the various forms of bovine mastitis, grouping them under the following headings :—(a) clinical or acute mastitis ; (b) subclinical (latent or chronic) mastitis and (c) mastitis contracted from infection from human septic sore throat. He suggests that workers on mastitis should be more precise in describing the form of mastitis with which they are dealing.

Concise details are then given of the actual procedure to be used in the various tests for mastitis at the farm or in the laboratory, and the practicability and value of the various methods are discussed.

The results of an examination of about 180 cows are given in the form of a coloured chart and show the relative efficiency of the various tests to be in the following order :—(1) abnormal milk (about 5 per cent. of samples examined) ; (2) direct microscopic examination of samples ; (3) the strip-cup ; (4) the reaction to brom-thymol-blue ; (5) cultural examination on Burri slopes or in veal-infusion-agar plates with or without blood, or microscopic examination of samples incubated overnight, each about 70 per cent. ; (6) a cell count over 500,000 per c.c. using Prescott and Breed's method ; (7) chlorides above 0·15 per cent. and (8) the catalase test (taking 10 per cent. of gas as positive), each of these indicating about 85 per cent. of infected udders. Udder indurations were also found in about 85 per cent. of cases. Milk which gives a positive reaction to any one of these tests will generally give a positive reaction to those following in the list.

The exact placing of physical diagnosis in the sequence of relative efficiency is made difficult because it may or may not include the use of the strip-cup and

brom-thymol tests and may be done in conjunction with a laboratory examination. Emphasis is laid on the necessity of veterinarians having special training and experience for this work.

From a practical standpoint it is not possible to remove all cows which give a reaction to the most sensitive tests ; on the other hand there is usually a progressive change until the abnormality may be detectable by the least sensitive tests.

—A. W. STABLEFORTH.

HUCKER, G. J., TRUDELL, F., & JENNINGS, W. S. (1932). **Mastitis. I. The Incidence and Detection of Sub-Clinical Streptococcus Mastitis.**—*New York State Agric. Expt. Sta. Bull.* No. 199. pp. 52. 4 figs. on 1 plate, 13 tables. [16 refs.]

The study was made on 221 cows, one to four samples of fore-milk being submitted to a routine chemical and bacteriological examination of which the results are tabulated on 21 pages. In the case of 129 cows, the results of the various tests were correlated with the findings at a physical examination prior to slaughter and at *post-mortem* examination.

Of 439 quarters which showed no evidence of active inflammation, but most of which showed some degree of fibrosis, 48 per cent. gave streptococcus-like colonies on veal-infusion-agar with or without horse blood, the number of colonies varying from a few to 100,000 per c.c. Of these infected quarters 18 per cent. showed pus pockets in the udder tissue *post mortem*. Of the quarters which showed no streptococci 3 per cent. showed pus pockets *post mortem*.

Post-mortem examination of a total of 560 quarters showed that 51 (9 per cent., belonging to 21 per cent. of the cows) had pus pockets. A table is given to show that the milk of 32 per cent. of these 51 quarters were abnormal by the strip-cup test, whilst 38 per cent. showed an abnormal amount of catalase, 67 per cent. an increase of chlorides above the normal level, and 81 per cent. the presence of fibrotic or indurated tissue.

Of 428 quarters on which a physical examination was made, 24 per cent. were normal whilst 76 per cent., representing 90 per cent. of the cows, showed fibrosis of a slight or marked degree. These findings were confirmed in practically every case *post mortem*. 18 per cent. of these fibrotic quarters showed pus pockets and in 78 per cent. streptococci were detected by cultural methods ; they were detected culturally in only one of the fibrosis-free quarters.

On the other hand, 67 per cent. of 236 quarters from which no streptococci were obtained and 98 per cent. of 204 quarters from which streptococci were obtained, had some degree of fibrosis.

Various correlations are made and the efficiency of the bacteriological methods used is placed in the following order :—microscopic examination of samples incubated overnight at 37°C., veal-infusion-agar plates, veal-infusion-blood-agar plates and, lastly, direct microscopic examination. It is noted, however, that long-chained streptococci were not found in all individuals known to have been infected, even after preliminary incubation, and that, on the other hand, long-chained streptococci were frequently found in incubated samples from quarters which never showed any evidence of mastitis before or subsequently. More than 3 million cells per c.c. indicated a past or present infection with streptococci. The determination of chlorides, lactose and catalase are regarded as effective means of detecting infected quarters, but as unsuitable for routine testing. Positive findings with the strip-cup or a definitely alkaline reaction to brom-thymol-blue always indicated an infected quarter. Negative findings did not always mean a normal quarter.

—A. W. STABLEFORTH.

WIEDMANN, F. (1932). Mastitis und Kohlenhydratmangel. Ein Beitrag zur Klärung der Frage der Entstehung und Verhütung der Euterentzündungen und Eutertuberkulose. **[Mastitis and Deficiency of Carbohydrate. A Contribution on the Question of the Origin and Prevention of Mastitis and Udder Tuberculosis].**—*Zschr. Untersuchg. Lebensmit.* **63.** 113-129. 2 tables. [41 refs.]

Determinations of sugar and chlorides in four cows, all of which were showing decreased sugar and increased chlorides, at intervals before, during, and after a period of increased carbohydrate feeding gave somewhat variable figures, but in the author's opinion showed that increased carbohydrate feeding is followed by a rise in milk sugar and a fall in chlorides ; *vice versa* when the carbohydrate is withheld. It is said that increase of carbohydrate in the food of a case of severe mastitis was followed by a return to normality whilst withdrawal of the extra ration resulted in a relapse.

The author concludes that mastitis in general and the associated changes (lowered milk sugar, increased chlorides, and alkaline reaction) are due to a lack of carbohydrate in the diet.

[The figures given, whilst suggestive, are inadequate to justify the conclusions reached].—A. W. STABLEFORTH.

SIMONATTI, E. (1933). Esperienze sulla disinfezione delle pelli carbonchiose. **[The Disinfection of Anthrax Hides].**—*Clin. Vet. Milan.* **56.** 180-190. 4 tables. [21 refs.]

The author states that many of the experiments designed to test methods of sterilizing anthrax hides have been carried out with the skins of small experimental animals and that consequently the results cannot be held to apply directly to infected bovine hides. In his own tests he has used pieces of bovine skin from the back, neck and shin. These were first dried in the sun and then kept in boxes with lime. Pieces were used after preservation for periods ranging from 5 to 12 months.

The methods described by SCHATTENFROH, by SEYMOUR-JONES and by STANDFUSS and POHL were used in the tests.

By SCHATTENFROH's method, using the solution suggested by PASCALE and PIRAS, it was not possible to destroy the anthrax contamination in ten days.

The SEVEIK modification of the SEYMOUR-JONES method (sublimate 1 : 2,000) was effective in not less than five days.

ABT's modification of this method (increasing the formic acid and keeping the sublimate at 1 : 5,000) was not effective in seven days.

The STANDFUSS-POHL method was effective in eight days, but it is probable that the marked swelling of the hide resulting from this prolonged treatment would render it unsuitable for commercial purposes.—A. LESLIE SHEATHER.

DE KOCK, G. (1932). **The Bovine Tuberculosis Problem in South Africa.**—*J. S. Afric. Vet. Med. Ass.* **3.** 53-65 and 97-105.

A general review of the bovine tuberculosis problem, particularly in its relation to South African conditions. After brief reference to the relation of bovine tuberculosis to public health, the author turns his attention to its economic importance to animal industry. Tuberculin tests show a low incidence in Government herds and in rural areas, but an incidence of 25 to 38 per cent. in other areas, dealt with under the Durban eradication campaign which was launched in 1930. Slaughterhouse figures, however, show a very low incidence of tuberculosis, even in dairy cows. Under " Methods of Control " Bang's method, Ostertag's method,

the Tuberculosis Order of Great Britain, 1925 and, finally, the accredited herd plan are discussed. Following this are sections on the difficulties encountered in applying the last-named scheme to the prescribed Durban area, and the sources which play a part in the reinfection of tested cattle (animal and environmental).

The second part of the article deals with the double intradermal test, frequency of testing, the cases of reaction in which no visible lesions are found, publicity, and the general policy which should be advocated in South Africa. The author believes that the application of a general eradication policy is impracticable for the ten million cattle of the Union, but that attention should be given to urban areas in collaboration with the Department of Public Health, whilst efforts should be made to prevent spread from urban areas and to enlist the help of the Breeding Societies in rural areas.

Under " Problems of Research " brief reference is made to the chemistry of the *Mycobact. tuberculosis*, the blood picture in tuberculosis, the presence of the disease in bovines and in game under veldt conditions, and the variable reactions of the body to *M. tuberculosis* according to species, type of bacillus and the allergic state of the animal. Full reports of work which is being carried out by various workers in South Africa, together with discussions of the literature concerned, are promised.—A. W. Stableforth.

Turbet, C. R. (1932). **Tuberculosis Control in Dairy Herds.**—*Agric. J. Fiji.* **5.** 27-29. 1 table.

The incidence of tuberculosis in dairy herds is compared with that in beef and other cattle. The reasons for the greater incidence in the former are given. The author urges the greater use of the tuberculin test on dairy cattle with a view to eradication and puts forward a general scheme of control suitable to the condition peculiar to Fiji.—C. R. Turbet.

I. Kauffmann, F. (1932). Kulturelle und serologische Untersuchungen zum Zwecke der Typentrennung der Tuberkelbacillen. [**Cultural and Serological Examination of the Type Differentiation of Tubercle Bacilli**].—*Zschr. Hyg. u. Infektkr.* **114.** 121-123. [6 refs.]

II. Price, R. M. (1932). **Types of Tubercle Bacilli in Human Tuberculosis.**—*Canad. J. Res.* **7.** 606-616. 9 tables. [2 refs.]

III. Griffith, A. S., & Munro, W. T. (1933). **Phthisis Pulmonalis due to the Bovine Type of Tubercle Bacillus.**—*Lancet.* **224.** 399-403. [6 refs.]

I. The author was unable to differentiate tubercle bacilli of human type from those of bovine type by fermentation reactions, by agglutination or by the absorption of agglutinins.

II. Of 436 cases of clinical tuberculosis studied in Toronto, 268 were in children under 14 years of age whilst the remaining 168 were in adults of 15 years and older. In the juvenile group, 230 patients were infected with the human type of tubercle bacillus and 38 or 14·1 per cent. with the bovine type. In the adult group, 162 cases were infected with the human type and 6, or 3·5 per cent., with the bovine type.

Enquiry revealed the probability of the cases of bovine infection being milk-borne and the opinion is expressed that the effective pasteurization of milk appears to be the only solution for the prevention of bovine infection. Pasteurization can only be considered safe when the procedure is carried out under rigid and scientific supervision.

III. Until recently, the bovine type of tubercle bacillus, although of frequent occurrence in non-pulmonary forms of human tuberculosis, had rarely been

found in cases of ulcerative pulmonary tuberculosis. The present account is of ten further cases of pulmonary phthisis occurring in Scotland from which tubercle bacilli of the bovine type have been isolated. The number of such cases now recorded in England and Scotland is 49. The majority of these patients were adolescents and young adults. It appears as if such a condition is often a late manifestation of an infection acquired in childhood through the channel of the alimentary tract. As far as can be ascertained, none of the patients has transmitted the infection to another human being and with two possible exceptions none of the cases appears to have acquired the infection from a previous human source. Six of the 49 cases were in persons who, in their employment, came into close contact with cattle. The work is being continued.—R. Lovell.

Helm, R. (1932). Die Typendifferenzierung der Tuberkelbazillen durch den Kulturversuch nach Wolters und Dehmel. [**Typing Tubercle Bacilli by Means of the Cultural Method of Wolters and Dehmel**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 73-76. [4 refs.]

The author gives an account of the typing of tubercle bacilli by means of the cultural method put forward by Wolters and Dehmel [(1930). *Zlb. Bakt. I.* (*Orig.*). **117.** 412]. For experimental purposes, 36 strains of human, 27 strains of bovine and 25 strains of avian tubercle bacilli were obtained from various sources. It was found that guinea pigs are moderately resistant to avian tuberculosis and more susceptible to bovine than to human tuberculosis. Whilst animal experiments may furnish a general indication of the type of tubercle bacilli injected, recent work has shown that the results obtained may not always be reliable; moreover, the method requires a certain length of time and is fairly costly. The author claims that definite results can be more readily obtained by growing subcultures of the bacilli on Petragnani's medium. The appearances distinguishing the three types of tubercle bacilli under consideration may be summarized as follows :—

The human type appears as a dry, crumbly, cauliflower-like, yellowish growth, the bovine type as a homogeneous, greenish-yellow, soft, moist, glistening growth, and the avian type as a moist, shiny, white, dirty white or yellowish growth, showing button-shaped elevations.

A decolouration of the media occurs with all three types. It is probably not solely due to the growth of the bacilli but also to the exchange of gases in the culture tubes.—A. J. Wilsdon.

Wolters, K. L. (1932). Ueber Umwandlungsversuche von Tuberkelbakterien verschiedener Typen durch Anpassung an den Wirtsorganismus. [**Transformation Experiments with Tubercle Bacilli of Various Types by Means of Adaptation in the Host**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 68-73.

Great controversy has centred round the possibility of changing one type of tubercle bacilli into another. From a review of the early literature on the subject, the author came to the conclusion that those who worked with pure cultures were convinced of this possibility, whilst those who did not held the opposite view. In order to test this theory, the author obtained two strains of bovine tubercle bacilli which showed a characteristic growth and of which 0·001 g. killed rabbits and guinea pigs with generalized tuberculosis in two months. These strains were passaged through hens and it was found that, after two passages, the cultures had become highly virulent for hens—these birds dying in 24 to 28 days after intravenous inoculation. On the other hand, they had become avirulent for guinea pigs and rabbits and, on culture, had lost their characteristic bovine growth. A third experiment was carried out using a human strain of tubercle bacillus ; this also

assumed the characters of avian tubercle bacilli after passage through hens.

Precautions were taken that the animals did not become affected spontaneously with tuberculosis during the course of the experiments. It was found that, in each experiment, the change in type characteristics did not take place until after the second passage.—A. J. Wilsdon.

Falchetti, E. (1933). Fixation du Bacille de Koch dans un Foyer inflammatoire chez le Cobaye tuberculeux. [**The Arrest of Koch's Bacillus in Inflammatory Foci in the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **112.** 288-290. [2 refs.]

The author gives an account of his experiments to determine whether, in experimental tuberculosis in the guinea pig, virulent tubercle bacilli become arrested in inflammatory foci produced by the injection of substances such as infusorial earth, living BCG or BCG killed by heat or formalin. At varying intervals of time following the injections, the presence or absence of tubercle bacilli in such foci was determined by microscopic and cultural examination and by inoculation into guinea pigs.

In only three instances out of 27 were tubercle bacilli found and then only in cases of generalized tuberculosis.—Gwilym O. Davies.

Hohn, J. (1932). Der Einährboden zur Kultur des Tuberkelbazillus (Amino-Einährboden). [**Egg Medium for the Culture of the Tubercle Bacillus (Amino-Egg Medium)**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 59-64.

Using a medium containing the yolk and white of eggs and 10 per cent. glycerine broth, the author has been able to isolate tubercle bacilli fairly satisfactorily from tuberculous material. To do this, however, it is necessary to wash the material in alkaline and then acid solutions, and culture from the acid sediment without previously washing with saline. Since this method does not always yield good results, experiments were carried out with various other media having egg and glycerine as their basis. Various substances such as 2 per cent. haemoglobin and 1 : 4,000 malachite green were tried and a detailed description of the preparation of such media is given in this paper. These, although an improvement on the older media, have not been universally accepted.

The author was then led to find a substitute for the glycerine broth and for this purpose Lockemann's synthetic solution was used ; this was not entirely satisfactory until certain amino acids were added to the solution, the most suitable being 2 g. alanin and 3 g. asparagin per 500 c.c. of solution. A detailed account of the preparation of this medium is given.

It is considered that the culture of tuberculous material on such an egg medium is not only an excellent method for the isolation of the bacilli, but also for the study of the biology of the organisms.—A. J. Wilsdon.

Lépine, P., & Valtis, J. (1933). Effets de l'inoculation intrapéritonéale du Bacille Calmette-Guérin (BCG) chez les Spermophiles de Macédoine. [The **Effects of the Intraperitoneal Inoculation of BCG into Macedonian Spermophiles**].—*C. R. Soc. Biol. Paris.* **112.** 1172-1174.

The lesions produced in these animals were macroscopically identical with those produced in the guinea pig or the rat. The omentum became studded with small nodules, and adhesions to the stomach and intestines developed. Frequently small nodules formed on the surface of the liver and spleen. In addition, in the male spermophile a small abscess about the size of a lentil developed in the testis.

This occurred with great frequency and in this respect the lesions differed from those produced in guinea pigs after intraperitoneal inoculation of BCG.

—D. R. Wilson.

I. Ninni, C., & Monaldi, T. de S. (1933). Rapport entre le degré de résistance des Cobayes à l'infection tuberculeuse d'épreuve et le délai écoulé après l'injection prémunisante de BCG. [**The Connection between the Degree of Resistance of Guinea Pigs to an Experimental Tuberculous Infection and the Time elapsing after the Immunizing Injection of BCG**]. —*C. R. Soc. Biol. Paris.* **112.** 1166-1167.

II. Nègre, L. (1933). Sur les délais d'apparition de la sensibilité à la tuberculine chez les jeunes Lapins prémunis avec le BCG par la voie buccale. [**On the Delay in the Development of Sensitiveness to Tuberculin in Young Rabbits immunized with BCG by the Oral Route**].—*Ibid.* 1171-1172.

I. The author showed that guinea pigs which had been immunized against tuberculosis with BCG were more resistant to a test inoculation of virulent bacilli at two months than at one month after the immunizing injection. As living BCG can be demonstrated by culture to be present in much greater quantity at one month than at two months after inoculation, it is concluded that immunity is closely related to organic modifications in the animal organism.

II. Young rabbits, ten days old, were immunized with BCG by the oral route on six successive days and were tested with tuberculin at regular intervals. Positive reactions were not obtained within a period of one month after the immunizing injections and in some cases sensitiveness was not in evidence until a period of five and a half months had elapsed. The results are comparable to those obtained by other workers with young guinea pigs.—D. R. Wilson.

Aubertin, E., & Reynes, V. (1933). Essai d'immunisation des Cobayes par inoculation prémonitoire d'éléments tuberculeux filtrables. [**Attempts to Immunize Guinea Pigs by Inoculation with the Filtrable Elements of Tuberculosis**].—*C. R. Soc. Biol. Paris.* **112.** 311-313. [6 refs.]

Numerous observers have demonstrated the immunizing power of the filtrable elements of the tubercle bacillus. Others have failed to demonstrate this property.

The authors state that, in their experiments, guinea pigs inoculated with the filtrate occasionally revealed a certain immunity but more often the results were completely negative, irrespective of the route of inoculation, the number of injections or the delay between the injections and the subsequent tests.

—Gwilym O. Davies.

Houthuis, M. J. J. (1932). Bijdrage tot de Diagnostiek en Bestrijding der Paratuberculose. [**Contribution to the Diagnosis and Control of Johne's Disease**].—*Thesis for Veterinary Doctorate, Utrecht.* pp. 165. 27 figs., 2 tables, 41 graphs. [83 refs.]

From an economic and epizootic point of view, it is desirable to diagnose Johne's disease at an early stage. Examination of faeces as well as biological reactions are therefore necessary. For the latter a high-grade specific johnin is most suitable. A positive johnin reaction is not always confirmed at autopsy and, on the other hand, it is possible for the johnin reaction to be negative in cases of Johne's disease. For the diagnosis of the disease *post mortem*, microscopic examination for the presence of the bacilli as well as histological examination of the intestine is necessary. Cultures must also be made. The author also found the organisms in other organs, particularly in the lung, the liver and the portal lymph glands.

Histologically, intestinal lymphangitis and destruction of Lieberkühn's crypts were noticeable. Infection of the body system occurs by continuous propagation or by transmission of the bacilli with the lymph. Since Johne's disease and tuberculosis can exist together, the johnin and intradermal tuberculin tests must be carried out. *Post-mortem* examinations of nine capons, infected with Johne's disease material, gave negative results. Two young infected calves showed a positive johnin reaction six months after infection. There should be legal recognition that Johne's disease is contagious and the reporting of animals suffering from diarrhoea should be compulsory.—J. VAN DER HOEDEN (UTRECHT).

I. DARZINE, E. (1932). Recherches sur les bacilles paratuberculeux de Moeller et de Grassberger. [**Research on the Paratubercle Bacilli of Moeller and Grassberger**].—*Ann. Inst. Pasteur.* **49.** 743-749. 4 tables. [1 ref.]

II. BRUYNOGHE, R., & ADANT, M. (1932). Un Bacille paratuberculeux. [**A Paratubercle Bacillus**].—*C. R. Soc. Biol. Paris.* **111.** 1051-1053. [5 refs.]

I. These saprophytic acid-fast bacteria were chosen for study by the author in his investigations of the group property of acid-resistance.

Early in his investigations he found that, in order to obtain comparable results for different organisms, particular attention must be paid to the temperature at which films are fixed and the temperature of the staining fluid, as both these factors influence the speed of decolourization.

The author found that the marked difference in acid-resistance of different organisms was related also to their vital resistance and that both these factors rested on the presence in the organisms of fatty substances soluble in chloroform. The higher the melting point of these substances, the greater the acid-resistance and vitality of the bacillus.

It is also stated that chemically pure fatty acids show the same staining reactions and that, if one varies the melting point by mixing two fatty acids of different melting points together, the speed of decolourization varies accordingly.

II. The authors describe the morphological and cultural characters of an acid and alcohol-fast organism which they consider to be different from the numerous known strains.

The following are some of the chief features of the organism. It grows best at 37°C. and produces an orange-yellow colour after 10 to 15 hours on solid media. It also resists the action of 15 per cent. sulphuric acid for five minutes. It is non-pathogenic for rabbits, white rats and pigeons and is of doubtful pathogenicity to guinea pigs.—GWILYM O. DAVIES.

DE FOSSET, A. J. (1932). **Swine Erysipelas.**—*Vet. Med.* **27.** 224-229. [9 refs.]

Swine erysipelas was first recognized as existent in the United States in 1920. The author brings evidence to show that it is present in both its chronic and acute forms and that the causal organism is widely distributed. In addition to causing the classical disease, it may cause arthritis in sheep and swine, septicaemia in the mouse and erysipeloid in man. The author emphasizes the harm to the pig industry if the disease is not promptly recognized. He advocates the sending of material to a laboratory for a confirmatory diagnosis. Enlarged joints, lymphatic tissue, affected skin, the heart with attached vessels ligated, and suspicious spleen and kidney tissues may be selected for examination.—R. LOVELL.

I. EMMEL, M. W. (1931). **A Study of the Bacterial Flora of the Intestinal Contents of Baby Chicks Affected with Pullorum Disease.**—*Poultry Sci.* **10.** 390-391.

II. Edwards, P. R. (1931). **Preliminary Report on a Variant Occurring Naturally in a Culture of S. pullorum.**—*Ibid.* 390.

III. Edwards, P. R. (1932). **A Variant Occurring Naturally in Cultures of Salmonella pullorum.**—*J. Amer. Vet. Med. Ass.* **80.** 891-894. 2 figs., 1 table.

I. A systematic study of the bacterial flora of the intestinal contents of 30 naturally infected pullorum-positive chickens showed that colon organisms constituted an average of 32·35, 38·02 and 63·35 per cent. of the bacterial flora in the duodenum, middle portion of the intestine and cloaca respectively. *Bact. pullorum* constituted an average of 47·26, 47·61 and 19·63 per cent. of the bacterial flora of the duodenum, middle portion and cloaca respectively.

The inoculation of a 24-hour broth culture of *Bact. pullorum* with colon organisms resulted in a reduction in the number of *Bact. pullorum* from 189,600,000 to 32,000,000 per c.c. after 24 hours incubation.

The hypothesis is made that the colon flora have a beneficial effect in the intestinal tract of chickens.

II. A very brief preliminary report upon the work quoted under III.

III. Several cultures of *Bact. pullorum* have been shown to have a marked tendency to form secondary colonies on the primary growth. These secondary colonies appear after the cultures have been left at room temperature for two weeks or longer. From the secondary colonies cultures have been isolated which form large colonies on agar plates and a heavy growth on agar slopes. The author finds the variant quite stable and possessing the biochemical and serological properties of the parent.—Norman Dobson.

Orr, A. B. (1932). **Salmonella Infections in Pigeons and Cage Birds : a Review.**—*Vet. J.* **88.** 562-564. [9 refs.]

This is a short non-critical review of the literature on infection of cage birds and pigeons with members of the salmonella group. It would appear from the information given that *Bact. aertrycke* is the common salmonella pathogen for such birds for, although it is not pointed out here, it is generally accepted that most animal pathogens recorded as " *Bact. paratyphosum* B " are *Bact. aertrycke*, whilst " *Bact. enteritidis* (Breslau) " is merely another name for *Bact. aertrycke*. [Two of the original papers give no evidence that sufficient tests were employed to identify fully the causal organisms]. Brief references to symptoms, *post-mortem* findings and preventive measures in the way of hygienic precautions are given. —R. Lovell.

Schott, R. G. (1932). **The Inheritance of Resistance to *Salmonella aertrycke* in Various Strains of Mice.**—*Genetics.* **17.** 203-229. 15 tables, 5 graphs. [21 refs.]

The experiments were planned to investigate the factors involved in reaction differences among various laboratory strains of mice when subjected to a controlled infection with a specific bacterial disease, usually *Bact. aertrycke*. The infecting dose was given intraperitoneally. Selection for resistance was carried on through six generations.

The author finds that certain individuals, after selection for resistance, when mated to totally susceptible animals, can produce progeny that resist disease as completely as progeny from matings among the selected animals themselves. The conclusion drawn is that a complex of at least partially dominant genes is largely responsible for resistance. The author considers that the minor part which might be played by passive immunity can be disregarded and that age,

weight and sex have not given any indication of association with resistance. The experiments show that certain individuals are important in the accumulation of hereditary resistance, but that an individual's breeding value in this direction cannot be assessed from the animal's phenotypic resistance. An intimate knowledge of the individuals in relation to their progenitors and progeny is necessary, in order to arrange matings that will maintain and increase the high level of resistance over a series of generations in a closed population.—Norman Dobson.

Adsersen, V. (1933). Bemaerkninger om Svineparatyfus. [**Remarks on Paratyphoid Infection in Swine**].—*Med. dansk. Dyrl.* **16.** 41-53. 2 tables, 1 map. [1 ref.]

A statement is given of the occurrence of the disease in Denmark, its manifestations, diagnosis, etc. The distribution of the herds attacked from 1926 to 1932 is shown in a map. The disease has become of more frequent occurrence during this period. In 1932 there were 51 herds affected. The disease occurs almost exclusively in herds that have been purchased and almost always in two to four-month-old pigs. Sometimes only a few pigs are infected, at other times a great number of the animals in a herd are infected in a few days, many deaths occurring. The disease is apt to subside rather rapidly, but there are also cases in which it persists in a herd for a very long time. In Denmark the course of the disease is generally an acute one accompanied by great mortality. The *post-mortem* findings are not very characteristic. In order to have a definite diagnosis, cultures are made from the spleen and from the mesenteric glands. Even if a cultivation of the paratyphoid bacilli of the pig from these organs is successful, swine fever caused by virus cannot be definitely excluded. The further course of the disease in the herd will generally give a definite answer to the query as to whether it is swine fever or pig paratyphoid. The former will attack pigs at any age, whilst the latter only attacks the young pigs. In case of doubt, material is sent in for further examination.

Vaccine treatment seems to have some effect. Ordinary hygienic methods are also employed in combating the disease. The disease is now governed by Section 10A of The Contagious Diseases in Domestic Animals Act of April 14th, 1920 [Denmark].—H. C. Bendixen (Copenhagen).

Schmedt, O. (1932). Ein Beitrag zur Kataphorese nicht agglutinierter und agglutinierter Bakterien der Paratyphusgruppe. [**An Investigation upon the Cataphoresis of Agglutinated and Unagglutinated Bacteria of the Paratyphoid Group**].—*Inaug. Diss. Berlin.* pp. 20. 1 fig., 3 tables. [10 refs.]

Part of this work on cataphoresis was carried out on a simple covered slide, whilst part was done in a special chamber of known dimensions. *Bact. paratyphosum* A and B, two strains of *Bact. enteritidis* and one of *Bact. suipestifer* were examined. The organisms moved towards the anode. When the cataphoretic action of agglutinating bacteria was examined it was found that, when homologous sera were used, movement towards the anode decreased as agglutination progressed and stopped when agglutination was complete. When heterologous sera were used the cataphoretic activity continued longer, and in cases where agglutination was poor, movement towards the anode was only slowed down slightly. For all organisms and sera used, the minimum current necessary to promote cataphoresis was six milliamps. Investigations were also carried out to ascertain how long after agglutination cataphoresis would reappear. With homologous sera, activity reappeared after two to three hours, and with heterologous sera after four to five hours.—E. J. Pullinger.

MANLEY, F. H. (1932). **Contagious Abortion of Sheep and Goats in Cyprus.**—*J. Comp. Path. & Therap.* **45.** 293-300. 4 charts. [5 refs.]

This outbreak of contagious abortion was apparently due to an organism closely allied to *Bact. abortus ovis*, though it differed from it in that it did not ferment xylose and seemed deficient in type antigens. The affected animals showed few signs of illness other than abortion after three to four months gestation; the disease was easily spread by contact and infection was produced artificially *per os*. Two ewes which were vaccinated with formolized culture proved resistant to an infection which killed a control animal. It was shown that sera from a goat and a ewe which had recently aborted were negative when tested against suspensions of *Br. melitensis* and *Br. abortus*.—EDWARD F. PECK.

HART, E. B., HADLEY, F. B., & HUMPHREY, G. C. (1932). **The Relation of Nutrition to Contagious Cattle Abortion.**—*Wisconsin Univ. Expt. Sta. Res. Bull.* No. 112. pp. 45. 6 figs., 17 tables. [16 refs.]

The experiment detailed in this report was carried on over a period of five years, and was planned to furnish an answer to the question of whether the course of abortion in a herd can be influenced by the value of the diet. It may be said at once that the results obtained furnish no indication that the relative good quality of the diet has any influence upon the spread of the disease.

The experiment was carried out on a specially purchased herd of 44 animals which were bought as calves and were kept (with a few exceptions) throughout the period of the test. The herd was entirely isolated and served by its own bull.

The herd was divided into two lots as regards rations. One half was fed on what is called a " good " ration and the other on a " poor " ration. Full details of the diets are given. Animals in each batch were, at suitable times, fed with infective stomach contents from aborted calves. Controls in each group were kept. The animals all mixed freely in the yards.

There was no material difference observed in the course of the disease. It was, however, noted that the animals on the " good " ration reacted to a higher titre than those on the " poor " ration. It was also observed that animals giving high titre agglutination tests tend to react for longer periods than those giving low titre reactions. Observations on the milk yields indicated that the " good " ration did not materially favour milk production.

At the time the experiment began it was believed that cod liver oil favoured the assimilation of calcium and phosphorus and for that reason it was added to the good ration. Subsequently this was withdrawn, as analyses showed that it led to a definite reduction in the fat content of the milk.

The " poor " ration was not below the standard of ordinary farm conditions and sufficed to maintain proper condition.

The experiment showed that, contrary to what has been stated, the addition of minerals does not influence the incidence of abortion favourably.

—A. LESLIE SHEATHER.

GILBERT, Ruth, & COLEMAN, Marion B. (1932). **Comparison of the Incitants of Undulant Fever in Man and Contagious Abortion in Cattle in New York State.**—*Amer. J. Path.* **8.** 609-610. [Presented at the 32nd Annual Meeting of the American Association of Pathologists and Bacteriologists, Philadelphia, Pennsylvania, April 28th and 29th, 1932].

Investigations indicated that nearly all the reported cases of undulant fever could be attributed to brucella organisms originating from either cattle or dairy

products. Goats have not been implicated and hogs could seldom be considered. A detailed study of the strains isolated from the patients affected with undulant fever showed them to have the characteristics generally attributed to bovine strains.
—T. M. Doyle.

Albrecht, A. (1932). Neuere Beobachtungen über Banginfektionen beim Menschen und deren Infektionsquellen. [**New Observations on Bang-Infection in Man and its Origin**].—*Munch. tierärztl. Wschr.* **83.** 506-510 and 517-522. [73 refs.]

Wichels, P. (1932). Ueber die Durchseuchung der Bevölkerung mit Bangbazillen. [**On the Contamination of the Population with Bang's Bacilli**].—*Zlb. inn. Med.* **53.** 2-10. [36 refs.]

Pepeu, F. (1932). Ueber das undulierende Fieber. (Brucesche und Bangsche Krankheit). [**On Undulant Fever. (Bruce's and Bang's Disease)**].—*Münch. med. Wschr.* **79.** 625-626.

Schittenhelm, A. (1932). Maltafieber und Banginfektion. [**Malta Fever and Bang Infection**].—*Klin. Wschr.* **11.** 905-908. 2 tables, 2 charts.

All are general reviews. The first is a fairly comprehensive discussion of all aspects of infection with *Br. abortus*. The second deals more briefly with the same subject, emphasizing the need for systematic search for brucella agglutinins. Pepeu bases his observations on his own infection. Schittenhelm discusses the similarity of infection with *Br. melitensis* and with *Br. abortus*, as regards clinical symptoms and treatment.—A. W. Stableforth.

Dettling, H. (1932). Ueber das Vorkommen von Bang-Agglutininen in Mittelfranken und Oberpfalz. [**On the Occurrence of Abortus Agglutinins in Mittelfranken and Oberpfalz**].—*Arch. Hyg. Berlin.* **109.** 61-65. [22 refs.]

Of 1,290 blood samples from the districts of Mittelfranken and Oberpfalz in Bavaria sent for a Wassermann test, 26 (2 per cent.) agglutinated *Br. abortus* at a dilution of 1 : 100 and were regarded as positive, 20 (1·6 per cent.) agglutinated at 1 : 50 and were regarded as doubtful. Of 341 samples from conditions associated with fever which were sent for a Widal test or as suspect of *abortus* infection, 11 (3·2 per cent.) agglutinated at 1 : 100 to 1 : 3,200, and 7 at 1 : 50.
—A. W. Stableforth.

Gray, J. D. A. (1932). **The Occurrence, Distribution, and Specificity of Agglutinins for Br. abortus in Human Sera.**—*J. State Med.* **40.** 673-676. 1 table. [13 refs.]

The author tested for the presence of *Br. abortus* agglutinins 2,116 human sera that had been submitted for the Wassermann test, and 275 (13 per cent.) showed complete or partial agglutination in a dilution of 1 : 30. Fifteen out of 62 women showing agglutinins in their sera had histories of abortions. There was no obvious relation to the results of the Wassermann test or previous TAB vaccination.

He found that in samples of sera fractioned with carbon dioxide, the specific agglutinins were present mainly in the soluble fraction of the serum.

A high ratio in the titre of the carbonic acid soluble fraction of the serum to that of the insoluble fraction was found to be characteristic of the sera of infected human beings and recently immunized rabbits, but this fell rapidly with the passage of time.—T. M. Doyle.

Zammitt, T., & Debono, J. E. (1933). **Immunisation of the Maltese Goat by Means of Cutaneous Vaccination.**—*Lancet.* **224.** 134-136. 1 table. [3 refs.]

This communication contains further experimental observations on a form of cutaneous vaccination which, as recorded in the *Lancet* [(1930). **220.** 1343.] promised to afford an effective method of protecting Maltese goats against *Brucella melitensis* infection.

Details are given of the preparation of the vaccine and also its method of application. Eleven healthy goats were vaccinated and subsequent immunity tests indicated that the method afforded sufficient protection against natural infection.—Gwilym O. Davies.

Crochet, A., & Rodieux, M. (1933). Étude d'un Bacille qui pousse en symbiose avec les Spirochètes des Poules (*Bacillus eucarians*). [**Study of a Bacillus which grows in Symbiosis with the Spirochaetes of Fowls**].—*C. R. Soc. Biol. Paris.* **112.** 841-842.

The spirochaetes of fowls require for their development a very low oxygen tension. It was thought probable that a strictly anaerobic organism might be sufficient to reduce the oxygen tension and foster the growth of the spirochaetes without being injurious to them. An organism closely related to *B. megatherium*, which the authors named *B. eucarians* (derived from the Greek word meaning " favourable "), was found to be suitable for this purpose.

The morphology, staining properties and cultural characteristics are given. —N. S. Barron.

Gill, D. A. (1933). **Report of Pulpy Kidney Disease of Lambs (an Acute Enterotoxaemia of Bacterial Origin).**—Res. Rep., New Zealand Dept. Agric. pp. 52. 12 figs. on 2 plates, 20 tables. [29 refs.] [fcp.] [mimeographed].

The author has issued a full Research Report on the above disease. This report has a foreword by the Director General of Agriculture, Dr. C. J. Reakes, and is divided into two parts :—general and epidemiological observation, and the aetiology of this disease. There is also an addendum dealing with *Clostridium ovitoxicum* (N.Z.) and *Cl. welchii* (Type D) Wilsdon.

In the first part, 29 pages, after a detailed description of the symptoms and pathology and analyses of pasture, soil, milk, etc., followed by a description of preventive measures employed, and the results of bacteriological examination, the author concludes that there must be some definite relationship between alimentation and the occurrence of the disease, which takes place where lambs of a certain weighty type are changing from a milk to a grass diet. It is suggested that it is rather digestive disturbance allowing the absorption of toxins from the gut than the high condition of the animal as seen in some other anaerobic bacterial diseases. Yarding of lambs, which is the most successful method of prevention, is thought to alter the pH of the bowel and so control the growth of the causative organism.

The second part is devoted to the finding of the organism, a description of it and its toxin production, toxin and antitoxin trials, artificial production of the disease with toxin and the effect of vaccine and antitoxin. Many references are made here to the work of Bennetts and others for comparative purposes. The whole of this part, which is well illustrated by figures and tables, has been very carefully put together to prove the fact that it is a strain of *Cl. ovitoxicum* which is definitely causative of pulpy kidney disease in New Zealand. The author can be congratulated on this very useful bit of work.

An addendum became necessary owing to the work that Wilsdon carried out at Cambridge. It was found that *Cl. ovitoxicum* in New Zealand was probably

identical with WILSDON's *Cl. welchii* Type D, but it is certainly the thermolabile toxin which was present in the intestines of lambs suffering from pulpy kidney disease and in sheep affected with enterotoxaemia and not the thermostable toxin.

A point of interest, in view of a recent article by MONTGOMERIE and DALLING [(1933). *Vet. J.* **89.** 223.], is found in pages 37-40 of the report. Previous to 1930, Dalling's antitoxin for lamb dysentery would neutralize toxin from *Cl. ovitoxicum*, both Bennetts and New Zealand strains, but in 1931 and later Dalling's new antitoxin would not neutralize and appeared to be similar to *Cl. paludis* antitoxin in this respect.—C. S. M. HOPKIRK.

I. REICHEL, J., & SCHNEIDER, J. E. (1932). **Blackleg Aggressin Immunization.** —*J. Amer. Vet. Med. Ass.* **81.** 768-775. 8 tables. [7 refs.]

II. NEWSOM, I. E., & CROSS, F. (1933). **Black Leg in Sheep Due to Shearing.** —*Vet. Med.* **28.** 16-20. 2 figs., 5 tables. [5 refs.]

I. As is well known, a potent aggressin is one which will make a sublethal dose of bacilli infective and in this article the authors stress the importance of standardizing the infective dose.

They prepared the infective dose by " using a 48-hour blackleg culture (stock culture 1912) grown in a liver brain medium, and transferred into 50-cc. bottles. The culture was frozen in a cold vault maintained at 5°F. Upon the removal of a 50-cc. bottle from the cold vault, the contained culture was allowed to thaw out slowly at 70°F., whereupon the infective doses were made within several hours." The minimal infective dose for bovines weighing 500 lb. was found to be 1·5 c.c. and for sheep weighing 80 lb., 0·075 c.c.

The authors offer evidence indicating that 0·5 per cent. formalin is preferable to 0·5 per cent. phenol as a preservative for aggressin, as not only does it assist clarification and candle filtration and eliminate sedimentation due to ageing, but also the total solid content of formolized aggressin was found to be greater and its aggressin content to be increased. An animal protection test described will permit of the potency standardization of blackleg aggressin.

II. This article recounts the course of an outbreak of blackleg in a herd of 2,000 ewes in Colorado. The total mortality was 145 sheep. An interesting feature of the outbreak was the absence of crepitation in the swellings. About 25 of the ewes developed an infection of the uterus with *Clostridium chauvoei* which was manifest by an accumulation of fluid between the chorion and uterus containing infective bacilli. Death occurred in every case, but none of the ewes aborted. In these cases no wound was seen, but the organism was recovered from the spleen.

It was found that 10 c.c. of blackleg serum given subcutaneously afforded no protection and the authors conclude that the dose should have been larger and given intravenously.

Tests conducted with aggressins and bacterins led them to the tentative conclusion that bacterins may be as effective as aggressins.—EDWARD F. PECK.

KNIGHT, C. J. G., & FILDES, P. (1933). **A Vitamin Necessary for the Growth of *B. sporogenes*: Its Relation to Auxin and other Growth Factors.**—*Brit. J. Exp. Path.* **14.** 112-124. 2 tables. [23 refs.]

A substance, which is apparently a vitamin, was separated while fractionating various extracts in the course of a study of the food requirements of *Clostridium sporogenes*. The preparation of this substance from bakers' yeast and a medium for its demonstration are described. Study of the chemistry of the *sporogenes* factor indicated that it may be a phenolic acid.

The authors recognized the similarity between the *sporogenes* factor isolated by them and auxin which helps to stimulate the elongation of plant cells. Norma urine has been found to be a source of auxin and an examination was made of urine for the *sporogenes* vitamin. It was shown that both auxin and the *sporogenes* vitamin occur in urine. A summary has been made of the striking resemblances between the properties of these two factors.

The *sporogenes* vitamin can be obtained from almost any living material and bacteria and moulds may synthesize it. It is not considered that it is specific for *Cl. sporogenes*.

From the evidence put forward, it is suggested that these two factors, if not identical, are members of a related group of substances, essential for the growth of bacteria, yeasts, moulds and plants.—A. J. Wilsdon.

Long, P. H., & Muellerschoen, Barbara. (1933). **Incidence of Anaerobic, Filter-Passing Organisms in Normal and in Abnormal Respiratory Tract Conditions.**—*J. Infect. Dis.* **52.** 121-125. 3 tables. [15 refs.]

The nasopharyngeal exudates from normal persons and those suffering from common colds were examined frequently over periods of two to six months. The secretions, obtained by washing out the nasopharynx, were passed through Berkefeld V candles and the filtrates, seeded into Olitsky and Gates' modification of the Smith-Noguchi medium, were examined for anaerobic filter-passing organisms.

Anaerobes of the *Bact. pneumosintes* type were isolated with equal facility from both groups. This observation supports the contention of previous workers that these organisms should be regarded as part of the flora of the normal nasopharynx, and that their presence cannot be correlated with affections of the upper respiratory tract.—R. E. Glover.

Braun, H., & Guggenheim, K. (1932). Ueber Atmungstypen bei fakultativ aeroben pathogenen Bakterien. [**On the Character of Respiration by Facultative Aerobic Pathogenic Bacteria**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 97-104. 5 figs., 1 table. [7 refs.]

The problem of the respiratory exchanges of bacteria has latterly received considerable attention and it is now known that cell respiration is carried out by means of enzymes or catalysts which contain certain of the heavy metals such as iron and copper. It has also been shown that, under suitable conditions, such catalysts can be broken down by hydrocyanic acid.

In this paper, the author has made use of calcium cyanide to study the respiratory process of certain bacteria. It was found that the most suitable media to use for this work was glucose agar broth. In each experiment a series of tubes was inoculated ; one tube was left as a control and dilutions of calcium cyanide from m/100 to m/800 added to the remainder. The tubes were incubated for several days and readings were taken daily. From these experiments it was seen that the growth of obligatory and facultative aerobic bacteria is arrested by small amounts of calcium cyanide. In the case of *Corynebact. diphtheriae* it was seen that the anaerobic growth of this organism is not inhibited to such an extent by calcium cyanide when the pH of the media is on the acid side as it is when the pH of the media is alkaline. With a very low pH, however, cyanide exhibits both the aerobic and anaerobic growth. Streptococci, on the other hand, show inhibition of growth in the presence of cyanide only when the medium is alkaline. - A. J. Wilsdon.

Seastone, C. V., & Lawrence, M. B. (1933). **Attempt to Confirm Existence of a Filtrable Cycle of Bacteria by Use of " K " Medium.**—*J. Infect. Dis.* **52.** 20-26. [10 refs.]

The authors were unable to confirm Kendall's observations demonstrating the existence of filtrable bacterial variants capable of reproducing themselves as true morphological entities. They presume that their failure may in part be due to lack of precise technical data. It is considered that Kendall's results may be caused by his K medium being of such a nature as to assist the passage of small bacterial particles through the filter and that these particles are unable to grow in the K medium owing to its lack of nutriment. When the filtrate is subsequently cultured on peptone broth medium the bacterial particles develop and a normal bacterial culture results; thus the appearance of a filtrable bacterial variant is simulated.—Edward F. Peck.

Seren, E. (1932). Ueber Mykosen. [**Regarding Mycoses**].—*Deuts. tierärztl. Wschr.* **40.** 276-282 and 294-296. 4 figs. [Numerous refs.]

Mycosis occurs in birds in two forms :—(1) disseminated nodules in the lungs under the visceral peritoneum and in the muscles and (2) more or less firm yellowish cheesy deposit on the serous membranes. The same types of lesion can be produced experimentally in guinea pigs, but in this animal nodules occur also in the liver, spleen and kidneys. In guinea pigs inoculated intraperitoneally the testicles are affected, nodules occurring both in the serous membranes and in the testicular substance.

Among seven cases of spontaneous mycosis of birds, other infections were present in six :—renal coccidiosis and intestinal parasites and infections due to *Bact. pullorum*, *Bact. aertrycke* and *Pseudomonas pyocanea*. It would appear that mycoses must be looked upon as a secondary infection, but there is evidence that they may produce a condition of intoxication if the infection is sufficiently extensive.

Note is made of the fact that it is often very difficult to identify the hyphae in sections from lesions ; cultural examination offers the best prospect of diagnosis. In sections stained with van Gieson's stain the hyphae retain the red colour, but it is a disadvantage of the method that they stain the same tint as the fibrous tissue strands. It is important to note that, according to the author, moulds do not appear as contaminations in the tissues of animals until several days after death.—A. Leslie Sheather.

McFadyean, J. (1932). **Actinomycosis and Actinobacillosis.**—*J. Comp. Path. & Therap.* **45.** 93-105. [13 refs.]

The main purpose of the article is to call attention to some prevalent misconceptions with regard to the connotation of the terms actinomycosis and actinobacillosis. Some well-known text books on pathology, both medical and veterinary, convey the idea that these diseases are caused by two nearly related organisms, and that in Great Britain and other European countries actinomycosis is the more important of the two diseases in animals. It is generally stated that the organism which is the cause of actinomycosis, properly so-called, was discovered by Bollinger in lesions in cattle and named the *Actinomyces* by his colleague, the botanist Harz, to whom the specimens containing the organism were submitted. Examination of the original publications, however, makes it probable, almost to the point of certainty, that Bollinger and Harz had before them specimens of both diseases. This conclusion is necessitated by the fact that the morbid specimens included diseased tongues—examples of the so-called " wooden-tongue " and, according to present knowledge, the disease in that organ is always caused, not by

the branching filamentous organism termed the *Actinomyces bovis*, but by a minute bacillus, as was first pointed out by LIGNIÈRES in 1902. A study of the illustrations of the *Actinomyces bovis* which accompanied the original paper by HARZ shows that these are of so coarse and diagrammatic a character as to make it impossible to say with confidence whether the organism sketched was the genuine actinomyces from lesions in the diseased jaws of cattle, or the small bacillus which is the cause of actinobacillosis affecting the tongue.

In 1891 WOLFF and ISRAEL cultivated a branching organism from human patients and assumed this organism to be identical with the one described by BOLLINGER and HARZ. This human organism, therefore, came to be known as the *Actinomyces hominis*, but it has to be remembered that HARZ had not succeeded in cultivating either of the organisms which must have been present in the material which he examined.

The existence of the organism termed the *Actinobacillus* was discovered by LIGNIÈRES and SPITZ in the lesions of cattle in the Argentine Republic, but in their monograph on the subject it apparently did not occur to them that the disease was a common one in all European countries. In consequence, even at the present day some medical writers appear to consider the disease peculiar to South America and rare or unimportant in Great Britain.

The article points out that confusion with regard to the application of the terms actinomycosis and actinobacillosis is revealed in the literature regarding the treatment of actinomycosis by iodide of potassium. That treatment was first introduced by THOMASSEN (1885), and abundant evidence was soon accumulated to show that it was remarkably successful in cases affecting the tongue. This, however, was before the discovery of the actinobacillus by LIGNIÈRES and SPITZ and it is now clear that it is the actinobacillus and not the actinomyces that is susceptible to this treatment. Surgeons in this and other countries have wrongly supposed that veterinary surgeons have found iodide of potassium curative in cases of actinomycosis in cattle, and this notwithstanding the fact that in THOMASSEN'S original article it was stated that treatment of the disease affecting the bones of the head had not been successful. All of these cases in which the lesions were located in the bones of the head and the iodide treatment failed may have been cases of actinomycosis.

CONCLUSIONS.

(1) Actinomycosis and actinobacillosis are aetiologically distinct diseases and they should no longer be united under a common name.

(2) Actinomycosis is the disease caused by the *Actinomyces bovis* which was first cultivated by WOLFF and ISRAEL. It includes practically all the cases hitherto so named in man and a minority of the cases in cattle in which the bones of the head are affected.

(3) Actinobacillosis is the disease caused by the *Actinobacillus lignieresi*, which was first cultivated and accurately described by LIGNIÈRES and SPITZ. In cattle it apparently includes all cases of the so-called " wooden-tongue " in all parts of the world and an uncertain proportion of cases involving other parts of the body, including the bones of the head. It is not known to be pathogenic for man.

(4) It appears to be possible that BOLLINGER and HARZ in 1877 examined cases of both diseases, but failed to observe the differences in the causal organisms.

—J. MCFADYEAN.

FELDMAN, W. H., & MANN, F. C. (1932). **Lesions in the Stomach of a Dog Simulating Actinomycosis.**—*J. Amer. Vet. Med. Ass.* **81.** 83-91. 4 figs., 1 table. [9 refs.]

A short history and the results of an autopsy on a dog affected with a condition closely resembling actinomycosis is described. Attempts to cultivate the causal organism from the pus in the lesions failed, as also did animal inoculation experiments. The pus contained granules similar to the sulphur-yellow granules of actinomycosis while the lesions on histological examination showed actinoform structures differing from those found in bovine actinomycosis.

The possibility of these structures being due to some organism other than actinomyces is recognized.—H. G. Lamont.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. Johnson, W. T. (1932). **Immunity to Coccidiosis in Chickens produced by Inoculation through the Ration.**—*J. Parasitol.* **19.** 160-161.

II. Yakimoff, W. L. (1933). Ueber Kokzidien. I. Zur Frage der Kokzidiose der Hausvögel in Russland (USSR). Die Nierenkokzidiose der Gänse. [**Coccidiosis. I. On Coccidiosis of Poultry in Russia. The Kidney Coccidiosis of Geese**].—*Zschr. Infektkr. Haust.* **43.** 239-241. 1 fig., 2 tables. [9 refs.]

I. Pure cultures of *Eimeria mitis*, *E. praecox*, *E. acervulina*, *E. maxima* and *E. tenella* were prepared from fresh faeces between April 23rd and May 15th and were fed with mash to two groups of two-month-old chickens between July 5th and July 20th, a third group of chickens, kept on one-inch poultry netting, serving as controls.

One of the inoculated groups showed detrimental results from treatment with *E. tenella*, but both these groups subsequently showed distinct protection to large doses of coccidia as against the susceptibility shown by the control group. The results were judged by the character and amount of faeces passed, the amount of food and water consumed, the activity and general appearance, the body weight, the mortality rate, the interval between inoculation and the appearance of symptoms and the number of oocysts in the faeces.

II. Records the detection of coccidiosis of geese at Leningrad. The kidneys of affected birds were red in colour with white spots and in the cloacae were found egg-shaped oocysts with one end drawn out and sharply truncated ; at this end was the micropyle. The majority of oocysts were 25·2μ long by 18μ broad which is somewhat larger than *E. truncata* of the goose, as described in other countries.
—U. F. Richardson.

I. Yakimoff, W., & Matikaschwili, I. (1932). La coccidie du hibou. [**The Coccidium of the Owl**].—*Bull. Soc. Path. exot.* **25.** 1045-1046. [1 ref.]

II. Yakimoff, W., & Matikaschwili, I. (1932). La coccidiose du Daim. [**Coccidiosis of the Deer**].—*Ibid.* 1048-1049.

III. Yakimoff, W., & Matikaschwili, I. (1932). **Coccidiosis of Skunks.**—*Ann. Trop. Med. & Parasitol.* **26.** 539-542. 2 figs. on 1 plate, 4 tables. [2 refs.]

IV. Yakimoff, W., & Matikaschwili, I. (1933). **Coccidiosis in Raccoons : *Eimeria nuttalli* n.sp., Parasite of *Procyonlotor*.**—*Parasitology*. **24.** 574-575. 1 fig. [12 refs.]

V. Kotlán, A., & Pospesch, L. (1933). **Coccidial Infections in the Badger *Meles taxus* L.**—*Ibid.* **25.** 102-107. 16 figs. on 1 plate, 2 tables.

I. In examining faeces from owls, the authors found oocysts which upon sporulation yielded one sporocyst and eight sporozoites. They suggest the name

Isospora henryi, basing their classification upon the fact that, in the genus *Isospora*, rapid sporulation sometimes results in the production of only one sporocyst.

II. The identification of oocysts of *Eimeria galli-valerioi* in the faeces of a deer is reported.

III. The identification of oocysts of *Eimeria mephitidis* Andrews, 1928, in 10 out of 13 samples of faeces from skunks upon a Russian farm is reported. Artificial infection in a whelp lasted five days.

IV. The oocyst of a coccidium of raccoons is described and the name *Eimeria nuttalli* suggested. A table of the coccidia of carnivora is given.

V. Two coccidial oocysts, belonging to the genera *Eimeria* and *Lucetina*, and parasitic in the badger, are described. Infection experiments with the *Eimeria* proved successful in a badger, but failed in cats. The *Lucetina* was found to differ from that naturally parasitic in the cat.—R. S. Roberts.

I. Yakimoff, W., Gousseff, W., & Nezwetaieff, N. (1932). Infection du zébu par Theiléries. [**The Infection of Zebu Cattle by Theileria**].—*Bull. Soc. Path. exot.* **25.** 1049.

II. Schwetz, J. (1932). Sur une épizootie de theileriose mortelle (East coast fever) à Stanleyville (Congo belge). [**An Epizootic due to a Fatal Theileriasis (East Coast Fever) at Stanleyville (Belgian Congo)**].—*C. R. Soc. Biol. Paris.* **111.** 1100-1102. [2 refs.]

I. This paper records the infection of a calf of zebu breed with *Theileria annulata* by inoculation with infected blood. Twenty-one days after inoculation, intracorpuscular parasites and plasma bodies were detected in the blood. The calf died after four days illness and a cow inoculated from the calf also died from the infection.

II. This records an outbreak of theileriasis in cattle on a farm near Stanleyville which was unlike the usual outbreaks due to *Th. mutans*, which are encountered in the Congo. This severe outbreak of disease was distinguished by the prevalence of the bacillary forms of theileria in the blood, by the presence of Koch's bodies in the glands during life and in the blood after death, and by the high mortality.

Arsenical three-day dipping was adopted, but 50 per cent. of the cattle on the farm died between October and February when the disease ceased. The outbreak was attributed to the introduction of cattle from the Sudan in two of which Koch's bodies were detected.

The author thinks that the organism was *Th. parva* and not *Th. dispar*, in view of the prevalence of bacillary forms and since the transmitter appeared to be *Rhipicephalus appendiculatus*. The symptoms did not entirely agree with those of East Coast fever, particularly in that kerato-conjunctivitis followed by blindness was of common occurrence.—U. F. Richardson.

Tzechnowitzer, M. M., Gorchowa, E. L., & Moldavskaja-Kritschewskaja, W. D. (1932). Die Melanoflockulation bei Malaria. [**Melanin Flocculation in Malaria**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 419-427. 3 tables, 2 charts. [11 refs.]

In order to simplify the test for large scale work, melanin from rabbits' eyes was tried and found satisfactory, and the amount of material was reduced to two drops of serum and 0·25 c.c. antigen diluted with 1 : 750 saline. The strength of saline was reduced to 1 : 750 as it was found that this concentration prevented anti-flocculation without inhibiting positive results.

In fresh malarial infections, the melanin flocculation test gave positive results in 95·7 per cent. of cases and in relapse malaria in 86·2 per cent. of cases. Positive

results were not obtained with sera from cases of syphilis, carcinoma, tuberculosis, abdominal typhus, leishmania or septic conditions, but they were given with sera from cases of spotted fever. Concomitant disease appeared able to prevent flocculation and one negative result was given by a case of malaria complicated by tuberculosis, whilst in the malarial treatment of syphilis the melanin flocculation test remained negative until the Wassermann reaction began to weaken.

The authors conclude that the test may be valuable as a means of determining the incidence of malarial infection in a populace, being more reliable than the splenic index or the parasitic blood index ; they also consider that it may be of service in determining the efficacy of treatment.—U. F. Richardson.

Boynton, W. H. (1932). **Further Observations on Anaplasmosis.**—*Cornell Vet.* **22.** 10-28. 6 figs., 1 table. [19 refs.]

This article is of special interest as it records observations on a pure form of anaplasmosis not complicated by piroplasmosis, in an area where the latter disease is unknown. The author leaves the nature of " marginal points " an open question, but since *Anaplasma marginale* occurs in the absence of *Babesia* (*Babesiella*) *bigemina* its connection with the latter cannot be close. The fact that anaplasma bodies give a nuclear reaction to Feulgen's test distinguishes them from Jolly bodies and, by first staining films with methylene blue and then with Toisson's fluid, a deep blue central area surrounded by a more faintly stained violet area can be detected, suggesting that the bodies are composed of two substances. Ring forms can be observed by fixing in 1 per cent. formalin for five minutes followed by staining with Jenner's and with Giemsa's stains.

Four types of the disease are recorded :—peracute, acute, chronic and mild. The mild type occurs in calves and might be overlooked if blood slides were not examined. In the peracute type, death occurs in a few hours and the disease may be mistaken for anthrax, haemorrhagic septicaemia or traumatic pericarditis. In this type the autopsy findings are summarized as lack of emaciation, little or no icteric discolouration of the viscera, enlargement of the spleen (up to two and a half times), slight enlargement of the liver, distension of the gall-bladder with slightly thick green bile, ectocardial and endocardial haemorrhages and petechial haemorrhages scattered over the thoracic pleura and diaphragm.

In the acute type, there is a drop in the red cell count from the normal of 7,000,000 per c.mm. to 3,000,000 or 4,000,000 and a decrease of haemoglobin from 13·5 g. per 100 c.c. to 8 g. per 100 c.c. of blood before symptoms appear. The symptoms are emaciation, weakness, loss of appetite and slight diarrhoea, followed by constipation and dribbling from the mouth, while the mucous membranes are pale or sometimes icteric. If regeneration of red cells occurs, recovery from this stage is rapid, but if the animal is incapable of regenerating red cells the anaemia becomes so severe that death ensues. The anatomical changes are those of severe anaemia complicated by jaundice and haemorrhages in the walls of the thoracic cavity and in the left ventricle.

The chronic type is similar to the acute, but the course of the disease is more protracted ; regeneration of red cells does not begin until the red cell count has fallen to 1,500,000 or 2,000,000 per c.mm. Jaundice is marked in the later stages ; the urine may be bile-coloured and, in a few cases, haemoglobinuria has been recorded.

In other areas ticks and flies have been incriminated as transmitters of the disease, but in California most outbreaks can be traced to mechanical transmission by human agents who fail to observe aseptic precautions in dehorning, castrating and other operations. Periodic outbreaks were recorded in herds 35 to 45 days

after bleeding for the abortion test. Carriers were detected and it was observed that those animals which were bled immediately after the carriers were the ones which contracted the disease.

The author considers that good care is the essential factor in treatment and, whilst referring to the claims of others of the beneficial use of drugs, he has not tested them himself. An experiment is recorded to show that animals treated with sodium cacodylate still harbour the parasite.—U. F. RICHARDSON.

I OMLIN, A. (1932). Versuche zur Immunisierung gegen die " Tristeza." Piroplasmose und Anaplasmose der Rinder. [**Research Work on Immunization against "Tristeza." Piroplasmosis and Anaplasmosis of Cattle**].—*Schweiz. Arch. Tierhlk.* **74.** 559-569. 5 tables.

II. VELU, H., ZOTTNER, G., & IPOUSTEGUY, P. (1933). Piroplasmoses Nord Africaines et Chimiothérapie. [**North African Piroplasmoses and their Treatment**].—*Bull. Soc. Path. exot.* **26.** 67-82. 1 table, 4 charts. [10 refs.]

I. This paper records investigations into the immunizing properties of *Anaplasma centrale* against " tristeza," a disease of Brazil, due to *Babesia* (*Babesiella*) *bigemina* and *A. marginale*. Two old cattle and four yearlings were inoculated with blood from two animals imported from South Africa and known to harbour *B.* (*Babesiella*) *bigemina* and *A. centrale*. The old animals suffered a severe reaction to redwater which, however, yielded to treatment with piroblue. In the young animals the piroplasmosis was mild, and in both groups the reaction to *A. centrale* was mild. On inoculation with the Brazilian virus no severe reaction occurred, but the reaction of a control was also mild. It was thought that the control, which was of South African parentage, might have some hereditary immunity and two further controls were inoculated with Brazilian virus and suffered severe reactions from which one animal died. It is of some interest to note that, when blood from the South African cattle was used for inoculation, a *Theileria mutans* infection developed, but did not cause serious symptoms.

Two strains of *A. marginale* obtained from England were also investigated for their power of immunization, but one strain caused a severe reaction, though both were satisfactory as immunizing agents.

II. This paper records the satisfactory treatment of a case of *B.* (*Babesiella*) *bigemina* infection with 1 g. of gonacrine administered intravenously.

Fourteen cases of *B. berbera* infection were treated with a single injection of 1 g. gonacrine (chloromethylate of diamino acridine), one death and 13 recoveries resulting, whilst one animal treated with ichthargan (silver ichthyol-sulphonate) also recovered. Twelve cases treated with other drugs all died.

Out of 21 cases of *Th. dispar* infection treated with gonacrine, 7 died and 14 recovered ; whilst out of 6 animals treated with antimosan (80 c.c. of a 6·3 per cent. solution) one died and five recovered. In the case of gonacrine, only one injection was given whilst, in the cases of antimosan, ichthargan and trypan blue, injections should be repeated on the following day. No ill effects were noticed from gonacrine, but ichthargan occasionally caused shock.

Th. dispar was diagnosed in cattle when cases of severe disease were associated with small piroplasms. The animals treated were of imported breeds and the seven deaths which occurred are explained by delay in treatment until the animals were already *in extremis*.—U. F. RICHARDSON.

CORDIER, G., & MENAGER, J. (1932). L'anaplasmose centrale expérimentale peut-elle conférer la prémunition contre l'Anaplasmose marginale expérimentale dans l'espèce bovine. [**Can Premunition against Experimental**

Anaplasma marginale **Infection be Conferred on Bovines by Experimental** *A. centrale* **Infection?**]—*Bull. Soc. Sci. vét. Lyons.* **35.** 162-170. 2 figs., 7 graphs.

Cordier, G., & Menager, J. (1932). Nouveaux essais de prémunition dans l'Anaplasmose marginale bovine. [**New Attempts to Produce Premunition in Bovine Anaplasmosis due to** *A. marginale*].—*Ibid.* 171-179. 6 graphs.

The first paper records the infection by inoculation of seven calves with a strain of *A. centrale* obtained from South Africa *via* the Pasteur Institute, Algiers. Four of the animals were later infected with *A. marginale* and suffered thermal and parasitic reactions, but no serious illness. Two controls inoculated with the same strain of *A. marginale* suffered severe reactions, from which one animal died.

The second paper records attempts to attenuate the virulence of *A. marginale* with a view to obtaining a vaccine suitable for conferring premunity. Virulent blood was kept for various periods at 4°C. in contact with human serum and also with serum from a mule infected with dourine ; attempts were also made to obtain mild reactions by treatment with acetylarsan and extracts of liver during the incubation period. No definite diminution of virulence was obtained. After irradiation with ultra-violet rays the incubation period was prolonged, but the virulence of the parasite appeared to be enhanced.—U. F. Richardson.

Sanborn, C. E., Stiles, G. W., & Moe, L. H. (1932). **Preliminary Experiments in the Transmission of Anaplasmosis by Horseflies.**—*Oklahoma Agric. Expt. Sta. Bull.* No. 204. pp. 16. 4 figs., 4 tables. [4 refs.]

Evidence is available that, in the United States of America, mechanical transmission of anaplasmosis takes place during surgical operations through the transference of infected blood from infected to healthy animals, by means of bull-tongs, needles and instruments used for castration and dehorning. The object of the experiments described was to determine whether transmission of infection could be effected by ticks and biting flies, particular attention being given to various species of tabanids or horse-flies.

Five species of tabanids were studied, namely, *Tabanus gracilis*, *T. sulcifrons*, *T. venustus*, *T. fuscicostatus* and *Silvius pollinosa*. The experiments are described in detail and tables and summaries are given. The net result of the experiments comprises four cases of transmission of anaplasmosis from infected to healthy animals. One cow exposed to the bites of all five species of tabanids, 43 bites in all, died of anaplasmosis 42 days after the first bites and 28 days after the last. A second cow was bitten by *T. gracilis* only and developed a mild attack of anaplasmosis. A third bitten by *T. sulcifrons* only also developed a mild attack from which she recovered. The fourth, bitten by *T. venustus* only, also developed typical symptoms and recovered. The first three were bitten by flies which had previously fed on an acute case ; the fourth, by flies which had fed on a carrier animal whose blood contained relatively few parasites. In the last case the period of incubation was longer than in the other cases.

The different species of flies and their habits under captivity are described in an appendix which also contains figures of four of them. No opinion is offered as to whether or not cyclical development of the anaplasm takes place in the fly, but the paper is not to be regarded as a final publication on the subject.

—Ll. E. W. Bevan.

Pigneur, G. (1932). Sur la Transmission héréditaire du Trypanosome Cazalboui-Vivax chez le bovidé du Ruanda-Urundi. [**On the Hereditary**

Transmission of *Trypanosoma cazalboui-vivax* **in Cattle in Ruanda-Urundi**].—*Ann. Soc. belge Méd. Trop.* **12.** 545-547. [6 refs.]

Transmission to the foetus *in utero* has been recorded in the case of *T. berberum* in camels, mice and guinea pigs and in the case of *T. equinum* in guinea pigs, but this method of transmission has not been detected in the case of *T. lewisi*, *T. brucei*, *T. congolense*, *T. soudanense* or *T. gambiense*. This paper records the detection, 24 hours after birth, of *T. vivax* in large numbers in the blood of a calf born prematurely from an infected cow. A goat, inoculated with 5 c.c. of blood from the calf, gave premature birth to a kid in which trypanosomes were detected. The author suggests that this method of transmission may explain the prevalence of trypanosomes in certain herds in the absence of tsetse flies. [The transmission of *T. vivax* from one adult to another occurs readily in the absence of tsetse flies]. —U. F. Richardson.

Saint-Prix, L. A. (1932). Étude de l'infection expérimentale du chien par Trypanosoma brucei. Traitement préventif et curatif par le 309 Fourneau-205 Bayer. [**A Study of the Experimental Infection of the Dog by** *Trypanosoma brucei*. **Preventive and Curative Treatment with Fourneau 309-Bayer 205**].—*Thesis for Docteur vétérinaire, Alfort*. pp. 96. 5 tables, 6 graphs. [210 refs.]

The author found that, after subcutaneous or intraperitoneal inoculation of the dog with a strain of *T. brucei* which had been maintained in mice, the incubation period was two to three days and the infection was always fatal. The trypanosome was found to invade the cerebrospinal fluid, but was usually only present in small numbers. The paper records investigations into various biochemical reactions, the rate of sedimentation of corpuscles and the formol-gel reaction. Two recoveries are recorded after treatment by an intravenous injection of 0·005 g. of Fourneau 309-Bayer 205 per kg. live weight and the author states that similar treatment was equally successful in other cases. If smaller doses of the drug were used, relapses occurred and there was some indication that *T. brucei* might acquire resistance to the drug.

Doses of 0·01 g. per kg. or over caused shock followed by diarrhoea, dyspnoea and emaciation. The medicinal dose used as a preventative appeared to give protection from infection for 15 to 30 days.—U. F. Richardson.

I. Reichenow, E. (1932). Das Verhalten von Trypanosoma gambiense in der Kultur. [**The Behaviour of** *Trypanosoma gambiense* **in Culture**].—*Zschr. Parasitenk.* **4.** 784-793. [11 refs.]

II. Nattan-Larrier, L., & Noyer, B. (1933). Les cultures du Trypanosome du Hamster (*Trypanosoma rabinowitchi*). [**Cultures of the Trypanosome of the Hamster** (*Trypanosoma rabinowitchi*)].—*C. R. Soc. Biol. Paris.* **112.** 523-525. [2 refs.]

III. Galliard, H. (1933). La culture de *Trypanosoma somalense* Brumpt 1903 de *Bufo regularis*. [**The Cultivation of** *Trypanosoma somalense* **Brumpt, 1903 of** *Bufo regularis*].—*Ibid.* 1325-1327. [1 ref.]

I. Records that a strain of *Trypanosoma gambiense*, after being maintained in a laboratory for three years, lost its power of development in von Razgha's medium (one quarter each of human or ape blood, and sodium citrate solution, with half of Ringer solution and 0·6 per cent. saline) which it had previously possessed. Another strain of the same trypanosome, freshly isolated from a patient, developed normally in the same medium. It is suggested that this loss of power of development in culture is comparable to the loss of the power of infecting the

tsetse fly. In spite of the cultivation of the recently isolated strain through seven generations over a period of 111 days, only forms similar to the intestinal stage in the tsetse developed. In attempts to obtain salivary gland forms, alterations were made in the salt concentration of the medium and transference was made to N.N.N. agar, but no success was obtained. The culture forms were not infective to experimental animals.

II. Emphasizes the resemblance of *T. rabinowitchi* in cultures to *T. lewisi*. It was thought that, by using rat blood medium, cultures might be contaminated with *T. lewisi*, but by use of control tubes this possibility was excluded. In rat blood media, at room temperature, leptomonad forms developed but, at incubator temperature, the majority of forms were metacyclic trypanosomes. Rabbit blood media were not so successful as rat blood.

III. The trypanosome of *Bufo regularis* grows well in N.N.N. medium at 20° to 25°C., or it will grow in simple blood media. It will also grow in Ponselle's acid hypotonic medium. In ordinary media, leptomonad or crithidial forms predominate, but in acid hypotonic media, trypanosome forms are numerous after seven to eight days.—U. F. Richardson.

I. Dunn, L. H. (1932). **Susceptibility of Bats to Infection with the Horse Trypanosome, *Trypanosoma hippicum* Darling, in Panama.**—*J. Prevent. Med.* **6.** 155-160.

II. Dunn, L. H. (1932). **Experiments in the Transmission of Trypanosoma hippicum Darling with the Vampire Bat, *Desmodus rotundus murinus* Wagner, as a Vector in Panama.**—*Ibid.* 415-424. [3 refs.]

I. This paper deals with the experimental infection of fruit-eating and insect-eating bats with *T. hippicum*. Infection was readily effected by intraperitoneal injection or oral administration of infected blood, but the disease in the bats was rapidly fatal, lasting 2 to 26 days, and it is improbable that these species can be important carriers of the trypanosome.

II. Dunn deals with experiments with vampire bats which were found to be readily infected by sucking infected blood either direct from an animal or after it had been drawn from the animal. The incubation period in the bat varied from 6 to 8 days and the disease terminated fatally in all bats in 9 to 27 days.

Infected bats were fed on guinea pigs and horses and 45·4 per cent. of the former and 27·3 per cent. of the latter developed an infection of *T. hippicum*. The author concludes that the vampire bat is a natural transmitter of *T. hippicum* in Panama and that equines can be protected by screening stables with wire netting of a mesh not more than one inch, or by illuminating stables at night.

—U. F. Richardson.

I. Saunders, G. F. T., & Morris, K. R. S. (1932). **The Distribution of Human Trypanosomiasis.**—*West Afric. Med. J.* **5.** 39-45. 4 figs. on 1 plate, 4 tables, 1 map. [8 refs.]

II. Saunders, G. F. T., & Morris, K. R. S. (1932). **Suggestions for the Control of Human Trypanosomiasis.**—*Ibid.* 62-64. [2 refs.]

III. Dyleff, P. (1932). Quelques réflexions sur la disparition spontanée des trypanosomes chez trois européens reconnus porteurs des trypanosomes. [**Some Reflections on the Spontaneous Disappearance of Trypanosomes in Three Europeans who were Carriers of Trypanosomes**].—*Bull. Soc. Path. exot.* **25.** 956-958.

I. Discusses the distribution of human trypanosomiasis in Ashanti and the Gold Coast and suggests that an apparent increase is due to more careful technique

in diagnosis—mainly the greater use of animal inoculation. In the authors' experience, sleeping sickness never occurs in districts free from *Glossina palpalis*. For statistical purposes, a formula connecting density of population, number of infected human beings and fly density-activity is suggested, but it is admitted that such formulae cannot be entirely reliable owing to such factors as occupational infection.

II. Points out that measures to combat trypanosomiasis must be governed by local conditions and suggests that small clearings give little protection against tsetse, particularly as in wet weather some tsetse leave bush in order to avoid excessive humidity. It is suggested that a vegetable barrier of dense low growth at the edge of clearings combined with the use of Harris traps might render it feasible to allow tall trees to remain in clearings for shade. Cattle drinking near a fly belt may not only lead to a concentration of fly at the watering place, but also to a definite increase of breeding as a result of the provision of a regular food supply.

III. Records the detection of trypanosomes in the deposits after centrifugation of three specimens of blood from Europeans ; in one case symptoms of trypanosomiasis were present. On re-examination, though animal inoculation was carried out, no further trypanosomes were detected, although in two cases no treatment was given.—U. F. Richardson.

I. Dias, E. (1932). O Trypanosoma cruzi póde evoluir na cavidade geral do Triatoma megista. [*Trypanosoma cruzi* **can develop in the Body Cavity of** *Triatoma megista*].—*Mem. Inst. Oswaldo Cruz. Rio de Janeiro.* **26.** 83-84. 1 plate.

II. Dias, E. (1932). Sur les déjections du *Triatoma megista*. Aspects du *Trypanosom acruzi* que l'on y rencontre. [**The Excreta of** *Triatoma megista*. **Aspects of** *Trypanosoma cruzi* **which are found in them**].—*C. R. Soc. Biol. Paris.* **111.** 486-489. 2 figs. [2 refs.]

III. Dias, E. (1932). Expériences sur la transmission du *Trypanosoma cruzi* de l'Insecte au Vertébré. [**Experiments upon the Transmission of** *Trypanosoma cruzi* **from Insect to Vertebrate**].—*Ibid.* 490-492. [5 refs.]

I. *T. cruzi* (armadillo strain) recovered from a guinea pig at the point of death was inoculated into insects of the genus *T. megista*. The insects were killed at intervals and their haemolymph examined. No evidence of an inhibitive action was obtained and their development appeared to proceed as in cultures.

II. From a study of the excreta of the insect, *T. megista*, the author concludes that of the two excreta, faeces and malpighian secretion, the latter varies in character, depending upon the time which has passed since feeding upon a host. At first it is turbid and yellow, but after a few hours it becomes transparent and colourless. It then becomes turbid and is invariably turbid and yellow by the following day. The transparent fluid contains neither cellular elements, proteins nor urates, but does contain uric acid ; it is of interest in that, when the insect is infected with *T. cruzi*, the parasites are present, as a rule in large numbers, in this transparent excretion, and are capable of producing infection through the unbroken skin in guinea pigs. The trypanosomes survived 72 hours in capillary tubes, but rapidly lost motility when the fluid was allowed to desiccate.

III. Infection experiments upon guinea pigs with the transparent excretion described in II are recorded. The author was able to set up trypanosomiasis in these animals by placing a drop of the excretion on the intact skin or in the conjunctival sac. The insects from which it was derived failed to set up the infection when they were allowed to feed upon guinea pigs.—R. S. Roberts.

Bos, A. (1932). Ueber Trichomoniasis bei Tauben. I. Die Kultur von Trichomonas columbae und ihre Bedeutung für die Diagnose der Trichomoniasis. [**On Trichomoniasis of Pigeons. I. The Cultivation of** *Trichomonas columbae* **and its Importance in the Diagnosis of Trichomoniasis**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 550-553. [6 refs.]

Cultures of *T. columbae* were obtained at the first attempt from the necrotic lesions of a pigeon which had died of trichomoniasis. Cultivation was carried out in a modified Locke-egg-serum medium of Boeck and Drbohlav; the solid portion consisted of egg and Locke's solution and the fluid portion of seven parts Locke's solution and one part inactivated horse serum. The optimal growth is reached in two to three days in the incubator at 37°C., but the cultures are still viable up to 42 days. Cultures were maintained for 20 generations.

Cultivation of the organism is useful as a confirmation of the microscopic findings and in some cases gives positive results when microscopic examination is negative, particularly so when the bird has become cold and microscopic examination is difficult, as the movements of the trichomonads cease and can only be renewed by warming.—U. F. Richardson.

Bennett, S. C. J. (1933). **Globidium Infections in the Sudan.**—*J. Comp. Path. & Therap.* **46.** 1-15. 14 figs. on 7 plates. [5 refs.]

The author gives a description of four cases of infection with a parasite similar to, if not identical with, *Globidium besnoiti*. Three of the cases occurred in horses, the fourth in an ox. The disease, the main lesions of which are in the skin, is probably restricted to Southern Kordofan. It is recognized as distinct from mange and ringworm by the horse-owning tribes.

In the equine cases, lesions were spread over the whole of the skin surface, though they were most noticeable on the eyelids and extremities owing to the more easily observed swelling of these points. In the ox, lesions were confined to the forequarters, neck and head. Increase in severity of the skin lesions was accompanied by a slowly progressing cachexia and in the later stages there was marked depression and considerable muscular weakness. The appetite continued good, but there was abnormal thirst. Pulse and respiration remained normal.

The parasites were confined to the skin and subcutis and to the mucous membrane and submucosa of the throat and, in one case, the nose. On *post-mortem* examination the maximum concentration of cysts was in the region of the epiglottis where many hundreds of spherical white cysts, about 0·5 mm. in diameter, were found in the mucosa. Cysts never extended past the upper part of the trachea or oesophagus, nor past the soft palate into the mouth. In one horse, cysts occurred in decreasing numbers up the nose for half the length of the nasal septum and in the tunica vaginalis of the scrotum. The viscera and skeletal muscles were always free from parasites; the muscles, however, were always pale brown in colour and friable. The author believes that the parasite spreads mainly in the subcuticular and submucous areolar tissues, but thinks that friction and grooming may favour its dispersal externally.

Diagnosis can be made by the examination of stained deep scrapings for the presence of the banana-shaped "sarcospores." In two of the cases "sarcospores" were found in blood smears, but their presence was probably due to contamination with material from the skin at the site of puncture of the vessel.

The author records his observations on the formation of the cysts and discusses the relation of the parasite to other species of the genus. He suggests either that his species should be removed to another genus or that the definition of the genus *Globidium* should be redrafted.—J. R. Hudson.

KLARENBEEK, A., & VOET, J. (1932). De Diagnose der Weilsche Ziekte bij den Hond. [**The Diagnosis of Weil's Disease (Leptospiral Jaundice) in Dogs**]. —*Tijdschr. Diergeneesk.* **59.** 1373-1379. [Summaries in English, French and German : abst. from orig.]

During the summer of 1932 many cases of leptospiral jaundice in human beings occurred in Holland. It is important to know whether dogs excreting leptospira should be controlled from an epidemiological point of view, especially because leptospirosis occurs frequently in Holland (ten infected dogs were treated in one month at the University Clinic in Utrecht). The disease sets in with apathy, anorexia, vomiting, immediate rise and fall of temperature, usually, but not always, followed by jaundice and the excretion of coffee-coloured urine. Kidney affection is very characteristic. As in human beings, the micro-organisms are found in the blood during the onset and up to the fifth day, and after the seventh to tenth day in the urine. Usually the serum acquires its lytic property after the second week and maintains it for about six months. Recovered dogs may excrete leptospira in the urine for a long time and this is an important factor in the spread of the disease in dogs as well as in man. In certain cases leptospirosis can explain the affection of the kidney in dogs.—J. VAN DER HOEDEN (UTRECHT).

KROSS, W., & ZUELZER, Margarete. (1932). Elektrophorese-Versuche an Spirochäten. [**Electrophoresis Research on Spirochaetes**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 360-395. 17 figs., 15 tables. [57 refs.]

ZUELZER, Margarete. (1933). Elektrophoreseversuche an Spirochäten. II. Mitt. Ueber elektrische Ladung und Säureagglutination. [**Electrophoresis Research on Spirochaetes. Part II. On Electric Charge and Acid Agglutination**].—*Zlb. Bakt. I.* (*Ref.*). **108.** 330-334. [1 ref.] [Paper presented at Meeting of Association of Berlin Microbiologists, Nov., 1932].

The first paper discusses very fully the technique of electrophoresic (cataphoresic) investigations of the behaviour of suspended particles, such as bacteria. It is pointed out that the speed and direction taken by particles depends largely upon the currents induced in the suspending fluid and therefore on the depth at which observations are made. A simple closed cell with electrodes of potassium chloride agar, suitable for dark ground illumination, is described, and also an electrical method of determining the hydrogen-ion concentration of small quantities of diluted sera or infected materials.

It was found that all living spirochaetes are negatively charged and that the living limits of *Spirochaeta icterogenes* were between pH 5·7 and pH 8·8. Acidity of the suspending fluid leads to a loss of charge which occurs between pH 6·5 and pH 4·5, whilst the organisms become positively charged between pH 5 and pH 4. In all cases positively charged spirochaetes were non-motile. The strength of charge varies with the strain and also between individuals of the same strain. The relationship between the electrophoresic characters and the biological characters of an organism is not yet known, but it is suggested that further research on electrophoresis may throw more light on the question of the variations in virulence of strains.

The second paper discusses the relationship between the iso-electric point and the acid agglutination point. In the case of spirochaetes, the acid agglutination point was usually slightly on the acid side of the iso-electric point. (The iso-electric point of *S. icterogenes* is pH 4·6 to 4·7 and the acid agglutination point pH 4·6 to 4·3). This difference may be due to their composition being a mixture of proteids or it may be due to loss of motility when the iso-electric point is reached.

Spirochaetes behave in this way like protozoa, whilst bacteria, even at the point of optimum acid agglutination, move to the anode.—U. F. Richardson.

I. Nicolle, C., & Anderson, C. (1932). Sensibilité du porc aux souches africaines de *Spirochaeta hispanicum*. [**The Susceptibility of the Pig to African Strains of** *Spirochaeta hispanicum*].—*C. R. Acad. Sci. Paris.* **194.** 333-335. [3 refs.]

II. Delanoë, P. (1932). Une observation d'infection naturelle du chacal due au spirochète marocain, *Sp. hispanicum* variété *marocanum* Nicolle et Anderson 1928, particulièrment longue. [**A Case of Natural Infection of Particularly Long Duration in a Jackal due to the Moroccan Spirochaete,** *Sp. hispanicum* **var.** *marocanum* **Nicolle and Anderson, 1928**].—*Bull. Soc. Path. exot.* **25.** 944-946. [2 refs.]

I. In this paper the authors claim to have succeeded in infecting young pigs with three strains of *Sp. hispanicum*. The infection is not indicated by any obvious symptom nor is it possible to demonstrate the spirochaete in the blood microscopically. The blood, however, is very virulent for susceptible animals.

Owing to the feeble susceptibility of the pig, it appears unlikely that this animal plays a very prominent part in the natural conservation of *Sp. hispanicum*.

II. The author records a case in a jackal, which was accidentally discovered in the course of daily microscopic examinations of the blood following experimental trypanosome infection. This is noted particularly, as Delanoë had previously stated that the only way of ascertaining the presence of spirochaetes is by the inoculation of suspected blood into a guinea pig.

By means of such inoculations in this case, the author was able to estimate the period of infection to have lasted at least 73 to 78 days in captivity, the animal being already infected when received.

This observation emphasizes the significance of the jackal as a reservoir of infection.—Gwilym O. Davies.

DISEASES CAUSED BY VIRUSES.

Bennett, S. C. J. (1932). **Contagious Bovine Pleuro-Pneumonia : Control by Culture Vaccines.**—*J. Comp. Path. & Therap.* **45.** 257-292. 8 tables. [16 refs.]

This interesting paper will repay study by all who are engaged in the control of pleuro-pneumonia in bovines. The paper is on work done in the Sudan during the last five years. The single injection method is the one discussed, and it has been provisionally assumed that " given an equal number of generations in subculture, all ' strains ' of virus culture will behave similarly."

The author attributes past difficulties in cultivating the virus to incorrect standardization of, or lack of nutriment in, the medium. He has evolved the following medium " consisting of ox heart muscle (500 gm. — 1,000 c.c.) to which 2 per cent. of peptone and ½ per cent. of sodium chloride is added. Before final sterilisation in tubes, bottles, etc., the reaction changes to about 7·4. In order to obtain a perfectly clear medium the bulk sterilisation is carried out at 120°C., and after distribution at 110° to 115°C. Before use 10 per cent. of sterile horse serum is added." This medium will give a visible growth in 24 hours and a maximum growth in five or six days. The addition of agar to the above broth gives an excellent solid medium.

A susceptibility of 99 per cent. and a mortality of 90·4 per cent. are recorded

in 139 animals used as control animals and inoculated with 1 c.c. of lymph. A number of atypical cases of pleuro-pneumonia in calves and adults showing arthritis and synovitis are mentioned.

It is concluded that a reaction following inoculation is not necessary to the establishment of immunity. The question of parallelism existing between loss of virulence and degradation of antigenic value is discussed, and it is stated that the pleuro-pneumonia virus loses its antigenic properties at a lower rate than its pathogenicity. From experiments Bennett found that " a second generation subculture was dangerous, but produced a solid immunity in less than three weeks ; a seventeenth generation subculture was safe, and produced a very sound immunity in three weeks and an absolutely solid immunity in less than six weeks ; a hundred and fifteenth generation subculture, although showing some degree of protective power, did not produce a serviceable immunity in nine weeks." It is noted that no cultures are being issued in the Sudan of less than 25 subcultures of a week each.

The effect of storage on vaccine is dealt with, and it is concluded that the antigenic value of virus cultures is degraded on storage, and that a high temperature produces this degradation more quickly than a low one. Little precise information is available as to the length of time immunity will persist, but there seems no doubt that two years is a conservative figure.—Edward F. Peck.

Alexander, R. A. (1933). **Preliminary Note on the Infection of White Mice and Guinea Pigs with the Virus of Horse-Sickness.**—*J. S. Afric. Vet. Med. Ass.* **4.** 1-9. [7 refs.]

The virus of horse-sickness has been found to be pathogenic for the mouse and the guinea pig and can be maintained in these animals by brain to brain passage. While infection of the mouse did not occur after subcutaneous, intramuscular or intravenous injection, virus which has been established was found to " take " after intraperitoneal injection provided the brain is injured simultaneously by the injection of 2 per cent. starch solution. The source of the virulent material was blood in sodium citrate solution taken from horses reacting to virus. Mice, which were inoculated intracerebrally were given 0·05 c.c. of 1 : 5 or 1 : 10 dilution. With passage, the period of incubation becomes progressively shorter ; with one strain it varied from an average of eight days in the second generation to six days in the ninth generation, with another it varied from seventeen days in the first generation to four days in the fifteenth generation.

With first generation virus the mice do not show characteristic symptoms and may be found dead or sitting huddled up in the cage any time between the eighth and twenty-third day. Quite frequently mice made a complete recovery. After the third subinoculation there is 100 per cent. mortality and as the virus becomes fixed the mice show definite symptoms. They become hypersensitive, paresis develops, usually of the hind legs and later they become comatose prior to death.

Confirmatory tests were carried out. On several occasions horses developed the typical clinical syndrome of horse sickness after subcutaneous or intravenous inoculation of mouse brain virus and serum of recently recovered horses neutralized many infective doses of mouse brain virus *in vitro*.

The author discusses the work of Nieschulz, who had been working independently, and he records his differing view with regard to the effect on the virus of passage in the mouse. With passage there is a progressive decrease in the virulence of the virus for the horse, Nieschulz having recorded that the virus is not attenuated nor altered in character.

In guinea pigs, a severe febrile reaction developed after an incubation period

of 48 hours. There was rapid loss of weight and progressive paresis followed by coma and death between the eighth and sixteenth day. In addition to the intracerebral route, infection has been produced in guinea pigs by intracardiac and intraperitoneal injections, in the latter case only after simultaneous brain injury. Tentative experiments have shown that guinea pig modified virus is more attenuated for the horse than virus which has passed through mice for a limited number of generations. It is suggested that mouse or guinea pig fixed virus may prove of great value in the development of a safe method of immunization of equines.

—D. R. Wilson.

Walkiewicz, W. (1933). W sprawie zmian histologicznych w jelitach przy pomorze swin. Badania nad powstawaniem miejscowej eozynofilji. [**Microscopic Changes in the Digestive Tract due to Swine Fever. Local Eosinophilia**].—*Wiadom. Wet.* **12.** 49-60. 2 figs. [19 refs.] [Summary in French : abst. from orig.]

The histological examination of the digestive tract of animals that have died of swine fever shows in the affected areas a collection of eosinophilic cells, bearing a strong resemblance to myelocytes. In the infiltrated zone these cells possess round nuclei. Nearest to the central part of the necrotic tissue the cells become irregular and lose their nuclei. In the middle of the necrotic mass only the aggregates of loosened fragments of cells and some eosinophilic granules can be seen.—K. Szczudlowski (Lwów).

Kraus, R., & Duran, A. (1932). I. Ueber die in Südamerika vorkommenden Epidemien der Hundswut bei Rindern und Pferden (Mauleseln). II. Nachtrag zur Arbeit über die in Südamerika vorkommenden Epidemien der Hundswut bei Rindern und Pferden. III. Ueber Varietäten der Lyssa. Ueber eine besondere Form der Hundswut beim Menschen auf der Insel Trinidad und über die Zugehörigkeit zur klassichen Form der Lyssa. II. Mitteilung. [**I. The South American Outbreaks of Rabies in Cattle, Horses and Mules. II. A Supplement to the Work on Rabies Epidemics of Cattle and Horses in South America. III. Varieties of Rabies. A Special Form of Human Rabies in Trinidad and its Relation to the Classical Strain. Part II**].—*Zschr. Immun.-Forsch.* **74.** 182-199, **75.** 363-365 and **76.** 285-296. 8 figs. [13 refs.]

I. The authors discuss the diseases of cattle and horses occurring in Brazil, Paraguay and the Argentine which are known by a variety of names, but are all characterized by symptoms of paralysis and are caused by a neurotropic virus. Negri bodies may be found in the brains of animals dying from these infections and if brain emulsion is inoculated into rabbits or dogs these animals become infected and Negri bodies can be demonstrated.

It is considered that these diseases, which in the past have caused serious losses to stockowners, are all of them varieties of rabies and differ from the classical strain in minor respects. Whether the strains from the different countries are identical is not yet known.

II. After referring to the above article on South American strains of rabies [see also this *Bull.* **2.** 12 and 148.] the authors claim to have shown that the Paraguay and Argentine rabies viruses isolated from cattle and horses are pathogenic for the fowl, producing typical rabies. They consider that the viruses of rabies and Aujeszky's disease are distinct entities. They confirm some of the conclusions reached by Hurst and Pawan [see this *Bull.* **1.** 285]. Attention is drawn to the confusion existing in South America between the trypanosome

infection, true " mal de caderas," and the South American equine rabies known under the same name [see this *Bull.* **3.** 25].

III. Examining Trinidad strains of rabies virus obtained from HURST and from REMLINGER it was found that after subdural inoculation the one produced a keratoconjunctivitis in guinea pigs and rabbits whilst the other did not. The possibilities that the Trinidad virus is a mixture of viruses, that the rabies strain produced the conjunctivitis or that the experimental animals carried a latent infection are discussed.

The authors do not consider that the Trinidad virus has been shown to be identical with the classical Pasteur strain. Cross-immunization of the two viruses is not complete. They think that the Trinidad strain should be considered a variety of rabies to which they would apply the term paralyssa [pararabies]. The question whether the Trinidad cattle rabies is identical with the South American forms can only be ascertained by accurate quantitative tests. [For the question of varieties see also this *Bull.* **1.** 53 and **2.** 215].—E. J. PULLINGER.

I. THIERY, J. (1932). Considérations sur l'examen des animaux atteints ou suspects de rage, principalement au point de vue de la virulence de la salive. [**Notes on the Examination of Animals affected with or suspected of Rabies, chiefly concerning the Virulence of the Saliva**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 62. [195 refs.]

II. THIERY, J. (1932). Considérations sur l'examen des animaux atteints ou suspects de rage principalement au point de vue de la virulence de la salive. [**Notes on the Examination of Animals affected with or suspected of Rabies, chiefly concerning the Virulence of the Saliva**].—*Rev. Path. comp.* **32.** 632-633.

III. NICOLAU, S., & KOPCIOWSKA, L. (1932). Le virus fixe existe-t-il dans le névraxe des Lapins qui subissent la vaccination antirabique ? [**Does Fixed Virus exist in the Nervous System of Rabbits that undergo Antirabies Vaccination ?**]—*C. R. Soc. Biol. Paris.* **110.** 348-352. 2 figs. [9 refs.]

I. The saliva of animals affected with rabies may be virulent 15 days before the appearance of symptoms. Cases of recovery from natural rabies have not been observed, but recovery may follow the inoculation of fixed virus, in which event the saliva may be found virulent four days after the disappearance of symptoms. Rabies may apparently occur as a latent infection for several months, but in such cases the saliva appears to be non-virulent. A chapter is devoted to the distinction of wounds which necessitate the use of antirabic treatment from those on account of which the immunization treatment is unnecessary ; delay may be serious, especially with facial wounds. In such cases treatment is indicated even when the animal appears normal at the time of attack.

II. This is a résumé of the above thesis.

III. The authors describe a mononuclear infiltration of the nervous tissue of rabbits that died following the subdural inoculation of brain emulsions prepared from rabbits at varying intervals of time after they had received a series of subcutaneous inoculations with attenuated rabies medulla. They were unable to transmit the disease in series and no bacteria or Negri bodies were demonstrated.

—NORMAN HOLE.

I. BANG, O. (1932). Pseudo-wut (akute infektiöse Bulbärparalyse) beim Rinde in Dänemark. [**Aujeszky's Disease amongst Cattle in Denmark**].—*Transactions of the Fifth Scandinavian Pathological Congress.* Held in Lund,

Sweden. July 3rd to 6th, 1932. Suppl. 11. *Acta path. et microbiol. scand.* pp. 180-182.

II. Følger, A. F. (1932). Ueber die histologische Untersuchung der Fälle von Pseudorabies an Rindern auf Sjaelland. [**The Histological Findings of Cases of Aujeszky's Disease in Cattle in Zeeland**].—*Ibid.* pp. 182-187. 2 figs. [1 ref.]

I. The symptoms described include fever, foaming at the mouth, excessive salivation, itching, sweating and accelerated breathing. Ground-up brain suspension from a typical case when inoculated into calves produced the disease, the incubation period being six to seven days and death occurring after an illness of one to two days. The disease was transmissible to rabbits and guinea pigs with an incubation period of three to four days ; itching at the site of inoculation was observed. Attempts to reproduce the condition by feeding were unsuccessful both in calves and in small laboratory animals. Brain kept in glycerine for five months showed no loss in capacity to infect animals.

II. This is a description of the histological findings of the disease in cattle. Preparations were made from the hippocampus, medulla oblongata and the spinal cord. [No special methods were used for demonstrating glial reaction]. The characteristic changes included small haemorrhages in the medulla and the spinal cord, particularly in the grey matter, and perivascular cell infiltration of lymphocytes and plasma cells ; no changes were observed in the ganglia cells or nerve fibres. One reference is quoted stating that no typical lesions were found at *post-mortem* examination. The author concludes that the disease is an acute encephalitis of a specific nature. There are no points of note in the discussion which followed. —J. R. M. Innes.

Thomsen, A. (1933). Om Hundesyge-Vakcinationen efter Laidlaw-Dunkin's Metode. [**The Vaccination against Canine Distemper by the Laidlaw-Dunkin Method**].—*Maanedsskr. Dyrl.* **45.** 81-90. [10 refs.]

During the period August, 1931, to August, 1932, vaccination against canine distemper by the Laidlaw-Dunkin (vaccine + virus) method was tested by 174 veterinarians on 876 dogs in Denmark. In the autumn of 1932 the result was known so far as 784 dogs were concerned. 747 dogs remained in good health ; 2 dogs had incipient canine distemper when the immunization was commenced, 5 dogs were attacked by the disease within 72 hours after the first injection (dead virus) and 14 dogs before the second injection (virus) should have been made. Only 14 dogs contracted distemper after both injections had been given. Even if all the dogs not submitted to a full treatment are included under the " failures " the method has—within the period of examination—only failed in 4 to 5 per cent. of cases.

Since August, 1932, about 1,200 dogs have been vaccinated in Denmark.

A statement is given of some less important conditions observed in connection with the vaccination : indisposition, abscesses, eruptions, etc.

The author considers this method of vaccination against canine distemper highly advisable, as the results attained—at any rate at present—are admitted to be excellent.—H. C. Bendixen (Copenhagen).

Danks, W. B. C. (1932). **A Histochemical Study by Microincineration of the Inclusion Body of Fowl Pox.**—*Amer. J. Path.* **8.** 711-716. 4 figs. on 1 plate. [9 refs.]

Incineration of fowl pox bodies at high temperatures leaves a residue consisting of minute particles of mineral ash, the localization of which corresponds topo-

graphically to that part of the inclusion body which stains pink with erythrosin-azur. They also correspond in relative size and location to Borrel bodies and are the inorganic residue of these structures. The evidence points to the Borrel bodies as a locus of absorption of the virus, but is insufficient to aid in the formation of any conclusions as to which cell constituents are responsible for the formation of fowl pox inclusion bodies, although it is probable that they are degenerate products of cell constituents and a result of the action of the virus.
—J. R. M. Innes.

INVERTEBRATE VECTORS OF DISEASE.

Duke, H. L. (1933). **Infection Rate of Glossina and Temperature.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **26.** 481.

This is a letter in which the author repudiates the imputation that he ever regarded the use of the incubator as of no significance in experiments on transmissibility. He stated, however, that it seemed to him unreasonable to base far-reaching conclusions, such as those of Lloyd, on evidence of this nature when the conclusions reached in Uganda rested entirely on work done at the ordinary temperature in a laboratory situated about a quarter of a mile from the lake edge where the local flies live.—U. F. Richardson.

I. Curson, H. H. (1932). **Distribution of Glossina in the Bechuanaland Protectorate.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 197-219. 8 figs., 4 maps. [12 refs.]

II. Curson, H. H. (1933). **Distribution of Glossina in the Bechuanaland Protectorate.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **26.** 297-300. 2 maps. [2 refs.]

I. This report deals with the historical records of the distribution of *Glossina morsitans* in Ngamiland and the variations which have occurred in the fly distribution between 1836 and 1931. It is interesting to note that " tsetse " is a word of Bantu origin which was originally applied not only to the flies, but also to the diseases produced. " Nagana " is a Zulu word for the disease produced and it has been ascertained that the actual organisms responsible for the disease are *Trypanosoma congolense*, *T. vivax* and *T. brucei.*

The records deal with two " fly " areas in Ngamiland on the Rhodesia and Transvaal borders. Fly was first encountered along the Limpopo by Harris in 1836 and, from the observations of the early explorers and hunters, it appears that some decrease of the area had occurred prior to the rinderpest epizootic of 1896. The author adds a word of warning : " Finally it should be remembered that one may travel in a glossina country and yet be unaware of its presence." A further reduction in the area occurred after the rinderpest epizootic and the fly-infested area was reduced to a minimum about 1908. A re-encroachment of fly on free areas became noticeable about 1921 and the commission of 1930, which consisted of the writer and Dr. Hale Carpenter, found that further considerable extension had occurred. The matter became of economic importance owing to the growing export trade in cattle to Rhodesia and great difficulty had been experienced in finding a fly-free route for the movement. Two appendices to the report record a limited test of a modified Harris fly-trap which the author considers will prove a valuable method of control, but will not lead to eradication, and also other arthropods encountered in the area.

II. This paper is a summary by the author of the report abstracted above.
—U. F. Richardson.

Schwetz, J. (1932). Notes géographiques d'Entomologie médicale sur la Province Orientale (Congo Belge). (Tiques, Tabanides et " Maringoins.") [**Geographical Notes on Medical Entomology in the Eastern Province (Belgian Congo). Ticks, Tabanids and " Midges "**].—*Ann. Soc. belge Méd. trop.* **12.** 549-555. [6 refs.]

This article records in tabular form the ticks, tabanids and small biting insects collected in various areas of the Eastern Congo. Ticks collected from wild game are included and the " midges " include *Simulium* and *Culicoides*. *Culicoides grahami* is stated to be the common form in equatorial forests whilst *C. confusus* is the common form encountered on tablelands.—U. F. Richardson.

DISEASES CAUSED BY METAZOAN PARASITES.

Patton, W. S. (1932). **Studies on the Higher Diptera of Medical and Veterinary Importance. A Revision of the Species of the Genus *Musca* based on a Comparative Study of the Male Terminalia. I. The Natural Grouping of the Species and their Relationship to each other.**—*Ann. Trop. Med. & Parasitol.* **26.** 347-405. 26 figs. [29 refs.]

The writer, after many years study of the genus *Musca* and a comparison of the male terminalia of 41 species, finds that these parts are of a remarkably uniform structure in all, showing the very close affinities of the species.

The species fall, however, into three natural groups :—the *domestica* group containing the simplest forms, the *lusoria* group the most specialized, the species of the *sorbens* group occupying an intermediate position. The species with a blood-drawing proboscis fall into the three groups, showing that the blood-sucking habit has been evolved independently in each group. Grouping of the species into different genera is considered inadvisable in view of the characters of the male terminalia. In discussing the importance of the genus *Musca* the writer mentions *M. crassirostris* as a probable transmitter of *Habronema* in horses in India as he has found the nematodes developing in flies of that species. A short description, covering 15 pages, is given of the male terminalia ; it is illustrated by the author's numerous camera lucida drawings, all to the same scale.

A series of papers is promised on the Palaearctic, Ethiopian, Oriental and Australian species of *Musca*. In these papers keys will be given for the identification of adults and larvae (where known), the present paper being of a more or less general and introductory nature. A request is made for additional specimens of certain species of *Musca* and Ethiopian and Oriental species of *Stomoxys*.

—J. S. Steward.

Varley, G. C., & Butler, C. G. (1933). **The Acceleration of Development of Insects by Parasitism.**—*Parasitology*. **25.** 263-268. [14 refs.]

The writers review the literature on accelerated development of insects (shortening of intervals of stages from hatching to emergence of adults) due to parasitism and record two new cases. The recorded cases of accelerated development are in the Apidae, Lasiocampidae, Noctuidae, Chrysomelidae and Muscidae, caused by parasites of the families Stylopidae, Tachinidae and Braconidae. The writers add the two families Chloropidae and Trypetidae to the list of hosts, and one, Chalcididae, to the list of parasites.

The phenomenon is discussed in a general manner and it is shown that in every case the parasite producing the effect is endophagous.—J. S. Steward.

Ross, I. Clunies. (1932). **The Occurrence of Bot-Fly Larvae (Gastrophilus veterinus) in Subcutaneous Tissues of the Horse.**—*Austral. Vet. J.* **8.** 34-35. [3 refs.]

Clunies Ross records the finding of four larvae of *G. veterinus* in the subcutaneous tissues of the hock of a yearling foal.

The present finding may indicate that sometimes, at least, skin penetration by the newly hatched larvae may occur.—J. S. Steward.

Freney, M. R. (1932). **Sheep Blowfly Investigations. Experiments on Artificial Baits : Preliminary Note on the Products of Decomposition of Wool Fibre (Keratin).**—*J. Sci. & Indust. Res., Australia.* **5.** 28-30. 1 table.

In a foreword Dr. R. J. Tillyard, Chief of the Division of Economic Entomology, explains the object of the experiments carried out by Freney and recalls that, under normal conditions, the hairy maggot flies or secondary flies are not capable of initiating " strike " in sheep and that their larvae are enemies to the smooth maggots which do initiate " strike." He also states that ordinary baits in use, such as liver, offal, or blowfly " soup " tend rather to attract secondary flies in preference to primary ones. All baits tested so far have been found to attract more female flies than males. It was found that an attractive medium resulted when wool fibre was decomposed by a solution of sodium sulphide. The fibre was obtained by extraction of raw wool with ether and alcohol and then washing the extracted material with warm water. The wool fat, suint, dirt and other extraneous material being removed, the wool fibre obtained as a final product consisted largely of protein keratin. This was hydrolysed with sodium sulphide. A small quantity of decomposed keratin kept moist on cotton wool was used as bait in experimental traps. The keratin mixture proved more attractive to primary flies, especially the brown blowfly, *Calliphora augur*, whereas a bait composed of brain substance attracted a larger number of the green hairy maggot blowfly, *Chrysomyia rufifacies*. A higher proportion of females (about 98 per cent.) was caught by the keratin bait than by " carrion " baits.—Ll. E. W. Bevan.

Bhalerao, G. D. (1932). **On the Identity of the Schistosome found in Cases of Bovine Nasal Granuloma and some Observations on a few other Members of the Schistosomidae.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 338-356. 25 figs. on 7 plates, 3 tables. [21 refs.]

A snoring disease of cattle due to a nasal granuloma is attributed to *Schistosoma spindalis* Montgomery, 1906. The association of schistosomes with the granulomatous condition was noted by Datta (1932) [see this *Bull.* **3.** 549.] and later confirmed by other workers.

In this paper, the author discusses in detail the morphological and taxonomical features of the causal parasite and compares it with the detailed description of the species given by Montgomery.

The author also discusses the variations which occur in the species *S. spindalis* alongside variations which have been noted in other species of schistosomes.

—Gwilym O. Davies.

I. Rao, M. A. N., & Ayyar, L. S. P. (1932). **A Preliminary Report on Two Amphistome Cercariae and their Adults.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 402-405. 2 figs. on 1 plate, 1 table. [1 ref.]

II. Simms, B. T. (1932). **Pathogenicity of Metacercariae of *Nanophyetus salmincola*, Chapin, for Fish Hosts.**—*J. Parasitol.* **19.** 160.

I. A cercaria from *Planorbis exustus* is described under the designation

" Cercaria No. 2 of Madras." Two hundred of these were fed to an experimental calf from which 40 specimens of *Paramphistomum cervi* were subsequently recovered and it is concluded that the cercaria is of that species. " Cercaria No. 2 of Madras " closely resembles *C. indicae* XXVI Sewell, 1922 and it is thought that this species is identical with *C. pigmentata* which Looss showed to be the larva of *P. cervi*. *C. indicae* XXIX Sewell, 1922, is also briefly described. Numerous specimens obtained from *Limnaea leuteola* were fed to a calf and a few specimens of *Fischoederius elongatus*, Poirier, 1883 were subsequently obtained at autopsy.

II. The author, who has previously written on the association of this trematode with salmon poisoning in dogs [see this *Bull.* **1.** 153.] describes, in this paper, his observations on the pathogenicity of the metacercariae for various species of trout. A high rate of mortality was observed in some fish hatcheries in association with a heavy infestation with this intermediate stage of the trematode, but severe infestation produced experimentally in laboratory-kept fish was not followed by disease.—E. L. Taylor.

Schoon, J. G. (1933). Ervaringen bij het onderzoek op Cysticercus inermis. [**Experience gained in Examination for** *Cysticercus inermis*].—*Tijdschr. Diergeneesk.* **60.** 17-26. 1 table. [Summaries in English, French and German : abst. from orig.]

According to the author, 4 per cent. of the cows slaughtered in the abattoir at Niymegen are infected with *Cysticercus inermis*, of which 25 per cent. are alive. In order to find out whether the parasite is alive, it is immersed in a mixture of bile and physiological salt solution at 37°C., after the capsule has been removed. Most of the cysticerci emerge after 10 to 15 minutes, but some not until 6 to 8 hours later. The majority were found in the masseter muscles and remarkably few in the cardiac muscle. The existence of cysticercosis in the cow has not decreased recently. The author is of the opinion that too little attention is paid to the campaign against taeniasis in human beings so that cattle can repeatedly become infected, especially in rural areas, where meat inspection is less rigorous. He considers that the public should be properly informed on the subject, particularly farmers. If necessary, insurance companies may refuse to compensate for any loss due to cysticercosis as a coercive measure.

—J. van der Hoeden (Utrecht).

Huet, M. (1932). Echinococcose, Tuberculine. . . . . et Tuberculose (?). [**Echinococcosis, Tuberculin . . . . . and Tuberculosis**].—*Bull. Soc. vét. prat. Paris.* **16.** 231-238 and 255.

In this communication, the author gave a brief history of a ten-year-old cow which was in a bad state of health. As the animal was negative to intradermal tuberculin tests in the subcaudal fold and in the lower eyelid, the presence of distomatosis was suspected. Pulmonary congestion was also present.

A second veterinarian also suspected hepatic distomatosis, but, in view of a suspicious cough, suggested the subcutaneous tuberculin test. The cow reacted to the test ten days after failing to respond to the intradermal test.

The cow was sent to the knacker and a third veterinarian reported on the autopsy to the effect that the lungs and liver were full of echinococcus cysts and that minute examination had failed to reveal lesions of tuberculosis.

The history of the case gave rise to an interesting discussion as to whether the cow was tuberculous or not and whether the subcutaneous test was influenced by the presence of parasitic cysts. In the discussion which followed, members expressed their views as to the stage of infection when animals commenced to

react to tuberculin, the comparative value of the various methods of performing the test and the quality of tuberculin used. Several expressed their confidence in the tuberculin test and pointed out that failure to find macroscopic lesions under such circumstances was no criterion of the absence of tuberculosis.

—Gwilym O. Davies.

I. Beach, T. D., & Ackert, J. E. (1932). **Does Yeast affect the Growth and Infectivity of the Nematode *Ascaridia lineata* (Schneider), in Chickens?**—*J. Parasitol.* **19.** 121-129. 1 table, 2 charts. [10 refs.]

II. Ackert, J. E., Porter, D. A., & Beach, T. D. (1932). **Age Resistance of Chickens to the Parasite *Ascaridia lineata*.**—*Ibid.* 157.

I. In the course of experiments previously carried out by Ackert and Nolf on the effect of vitamin deficiency on the susceptibility of fowls to *A. lineata*, results were obtained which suggested that yeast contained some agent apart from the vitamin B complex which actually stimulated the growth of the worms. The experiments here recorded, involving observations on 262 chickens, were planned to probe this possibility, but led the authors to the conclusion that no such special growth-stimulating agent is contained in yeast.

II. The observations reported in the second paper demonstrate the development of a " growth inhibiting factor " for *A. lineata* in the intestine of chickens. Parasite-free chickens of different ages received 300 eggs of *A. lineata* and, after the infection had been allowed to develop for three weeks, they were killed and all the worms collected and measured. It was found that chickens infected when 45 days old yielded worms averaging 21·19 mm., those infected when 63 days old yielded worms measuring 16·10 mm., those infected when 71 days old yielded worms measuring 11·96 mm. and those infected when 93 days old yielded worms averaging only 3·93 mm. long.—E. L. Taylor.

I. Foster, A. O. (1932). **Prenatal Infection with the Dog Hookworm, *Ancylostoma caninum*.**—*J. Parasitol.* **19.** 112-118. 2 tables. [8 refs.]

II. Cort, W. W. (1932). **Variations in Hookworm Disease.**—*Ibid.* 142-147. [11 refs.]

I. Experiments planned to ascertain whether immunity to *A. caninum* might be transmitted *in utero* to the foetus or by the milk to suckling puppies unexpectedly provided some very interesting information on prenatal infestation with that worm. In the first instance 5,494 larvae were given *per os*, 2,500 of which were given to the bitch during the period of pregnancy. All the puppies of this litter died within 12 to 18 days of birth and were found to harbour between 45 and 71 mature worms each. In the second instance more larvae were given, 10,480 before pregnancy and 3,000 during the pregnant period, and of the eight puppies one was still-born and the seven others died within 25 days of birth, carrying up to 179 mature hookworms each. Repeated heavy doses of infected larvae given in one instance before the period of pregnancy and a large dose of infective larvae given in another instance 38 days before the birth of the puppies did not result in prenatal infestation. It seems not improbable that exposure of pregnant animals under natural conditions to infection with this parasite may be an important cause of mortality in early life.

II. Reference is made to recent work on immunity responses of their various hosts to *A. caninum*, *Haemonchus contortus*, *Nippostrongylus muris* and *Heterakis spumosa* and the suggestion made that these results show a kind of immunity, which may be common to many helminths, serving to regulate the size of infestations. It has also been shown, however, that this resistance may be broken down

by repeated bleeding or undernourishment and the various types of infection with any one species of parasitic worm are a result of the interaction of these agents. Thus, infection of *A. caninum* may be of the following four types : — (1) " fatal acute," produced in susceptible puppies by a single heavy dose or by repeated heavy doses ; (2) " acute," producing severe anaemia in susceptible puppies which are, however, able to recover as a result of a developed resistance ; (3) " chronic," in resistant animals exposed to repeated infection and (4) " severe " where an animal's resistance is lowered by undernourishment. The author leads to the conclusion that undernourishment may be a very important factor concerning the incidence of human ancylostomiasis.—E. L. Taylor.

I. Nagaty, H. F. (1932). **The Genus** *Trichostrongylus* **Looss,** 1905.—*Ann. Trop. Med. & Parasitol.* **26.** 457-516. 77 figs., 4 tables. [66 refs.]

II. Mönnig, H. O. (1932). *Syngamus indicus* : **A New Nematode from the Indian Elephant.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 173-175. 4 figs. [1 ref.]

I. After making a careful study of the literature and examining representative specimens of most of the species, the author revises the genus *Trichostrongylus*. The 13 species which he confirms are redescribed and illustrated, some new hosts are recorded and the name *Asymmetricostrongylus* suggested for a new genus to receive the three species *T. asymmetricus*, *T. australis* and *T. dissimilis* : the author promises to discuss this change later [as also, presumably, the definition of the new genus. It is hardly necessary to state in defence of the " Index-Catalogue of Medical and Veterinary Zoology " by Stiles and Hassall that *Nematodirus filicollis* Rud, (1902) is not considered therein as a member of the genus *Trichostrongylus* as stated by the author].

II. This new species is described from one male and one female specimen found in the posterior part of the pharynx of an Indian elephant which had been brought over from India a few months previously. The worms most closely resemble those of the species *S. hippopotami*, but show minor differences, particularly in the bursa of the male.—E. L. Taylor.

Stoll, N. R. (1932). **Studies with the Strongyloid Nematode,** *Haemonchus contortus*. **II. Potential Infestation Curves under Conditions of Natural Reinfection.**—*Amer. J. Hyg.* **16.** 783-797. 5 figs., 1 table. [7 refs.]

Two uninfected lambs placed on clean grass plots received an initial infestation of 45 larvae of *H. contortus*. Observations were made on the number of eggs passed in the faeces of the two lambs enabling the author to follow the rise and fall of actual infestation. From data concerning weather conditions, daily output of eggs by *H. contortus* and the average time required for the development of the infective larvae and of the adult worms, it was possible to calculate the potential infestation, and comparisons are drawn between the actual and the theoretical infestation resulting from the initial dose of infective larvae which further demonstrates the development of resistance in infected lambs.

—E. L. Taylor.

Stumberg, J. E. (1932). **Detection of Proteins of** *Haemonchus contortus* **in Sera of Infected Sheep and Goats.**—*J. Parasitol.* **19.** 156-157.

In this summary it is stated that the injection intraperitoneally into sensitized guinea pigs of the sera of sheep and goats infected with *Haemonchus contortus* resulted in a rise in the relative count of eosinophile leucocytes ; a similar rise occasionally resulted in control guinea pigs also, but was less pronounced.

This reaction did not result where the test serum was taken from sheep infected with worms other than *H. contortus*, from sheep which had previously harboured *H. contortus* but were not so infected when the serum was taken, or from sheep free from helminth infection of any kind. The test was found to be sufficiently sensitive to detect haemonchus protein in a dilution of 1 : 50,000.

—E. L. Taylor.

I. Bachman, G. W., & Rodriguez-Molina, R. (1932). **Resistance to Infestation with *Trichinella spiralis* in Hogs.**—*J. Parasitol.* **19.** 159-160.

II. Augustine, D. L. (1932). **Effects of Quick Freezing upon Infective Larvae of *Trichinella spiralis*.**—*Ibid.* 175.

III. Reifenstein, E. C., Allen, E. G., & Allen, G. S. (1932). **Trichiniasis. A Discussion, with Reference to Eleven Recovered Cases in a Family.**—*Amer. J. Med. Sci.* **183.** 668-678. 1 plate, 2 tables. [53 refs.]

IV. Lommatzsch, R. (1933). Versuche zur Beschaffung von trichinösem Demonstrationsmaterial durch Infektion von weissen Ratten und Mäusen. **[The Preparation of Trichinosis Demonstration Material by the Infection of White Rats and Mice].**—*Zschr. Fleisch- u. Milchhyg.* **43.** 161-163. 3 tables. [4 refs.]

I. Leucocyte counts, precipitin tests and estimation of haemoglobin were carried out at intervals of five days on ten pigs over a period of 345 days, between 500 and 600 g. of trichinous meat being given to the pigs every 80 days. A high eosinophile count and high precipitin titre were observed during the first infestation in the five animals which recovered, but a rapid decrease or total absence of these reactions was observed after subsequent infestation. Intramuscular injections of a 1 per cent. suspension of trichina powder produced eosinophilia and a high precipitin titre, but the animals were not resistant to trichinosis and it is concluded that the resistance shown to superinfestation is due to a localized cellular activity operating during the intestinal phase of infestation.

II. Trichinous pork was reduced within six hours to a temperature ranging as low as −34·6°C. and subsequently fed to experimental animals to ascertain whether its infectivity had been destroyed. Heavy infestation resulted from the feeding of meat which had been exposed to a temperature of only −21°C., slight infestation after exposure to −27·6°C. and slight infestation in about half the experimental mice after exposure to −30·9°C. Although some larvae which had been exposed to −33·7°C. appeared on microscopic examination to be still alive, they were unable to produce infestation, and after exposure to −34·6°C. all larvae appeared to be destroyed. It is claimed that rapid freezing may have certain advantages over the present practice of prolonged freezing at a higher temperature.

III. This paper presents a concise discussion on the diagnostic criteria of trichinosis. Marked eosinophilia was present in each of the 11 cases examined, but it is pointed out that eosinophilia is not a constant indication of infection.

IV. The difficulty in finding fresh trichinosis material for demonstration purposes may be overcome by feeding trichinous pork to rats and mice. If the pork has been stored at a temperature as low as −5°C., however, it is unlikely to produce infection unless the trichinous larvae are properly encapsuled. An account is given of some of the results obtained by the author from feeding fresh trichinous meat and trichinous meat out of cold storage to rats and mice.

—E. L. Taylor.

Walker, A. T. (1932). **Trichiniasis. Report of an Outbreak Caused by Eating Trichinous Bear Meat in the form of "Jerky."**—*J. Amer. Med. Ass.* **98.** 2051-2053. [1 ref.]

" Jerky " is a form of meat preserved by drying in the sun after having been cut into long thin strips. The present paper reports on an outbreak of trichinosis which was traced to the consumption of " jerky " made from the flesh of a brown bear which had been shot in California. Muscular pains were complained of by four out of five patients, but only one showed swollen eyelids which is often a marked symptom. Eosinophilia did not appear, even a few hours before death in those cases which terminated fatally, nor did it appear in the other cases until recovery had commenced, when the dissemination of larvae had presumably terminated and encystment had begun.—E. L. Taylor.

Lucker, J. T. (1932). **Some Cross Transmission Experiments with Gongylonema of Ruminant Origin.**—*J. Parasitol.* **19.** 134-141. 1 table. [11 refs.]

It has been clearly shown by Baylis that *G. scutatum* (from ruminants), *G. pulchrum* (from swine) and *G. ransomi* (from swine in the United States) are morphologically identical. The question of biological identity has not, however, definitely been decided. The author has carried out cross-infection experiments and succeeded in transferring gongylonema of ruminant origin to two pigs : the worms thus obtained he afterwards found to be morphologically indistinguishable from *G. ransomi*. White rats, guinea pigs and rabbits were also infected with worms of the same origin, and on subsequent examination these proved to be indistinguishable from *G. pulchrum*. This evidence is interpreted as affording adequate reason for concluding *G. scutatum*, *G. ransomi*, and *G. pulchrum* to be specifically identical. —E. L. Taylor.

IMMUNITY.

—. (1933). **The Double Intradermal and Subcutaneous Tuberculin Tests.**—*Vet. Rec.* **13.** 86-88. 1 table. [Discussion at a meeting of the Lancashire Division of the Nat. Vet. Med. Ass., Dec. 16th, 1932].

The discussion centered round the interpretation of the double intradermal test and, in the main, it was agreed that the demonstration of heat and pain were necessary for the diagnosis of a positive reaction as well as local swelling. Twenty-three cases were brought forward substantiating this opinion.—Edward F. Peck.

Malou, A. (1932). L'épidermo-réaction à la Tuberculine chez les animaux domestiques. **[The Cuti-Tuberculin Reaction in Domestic Animals].**—*Thesis for Docteur vétérinaire, Alfort.* pp. 62. [28 refs.]

The author has studied the epidermal reactions to tuberculin in the lower animals. Special discs were prepared by soaking small squares of paper in a concentrated tuberculin and these were applied to the skin without preliminary scarification. In the tuberculous horse, a crop of vesicles were produced at the 24th hour followed by a well-marked serous exudate and the formation of thick crusts, while in cattle the reaction appeared as a well-defined oedematous swelling reaching its maximum at the 24th hour.

In horses, cattle, monkeys and rabbits the reactions were clear-cut, but in dogs and cats they were somewhat difficult to interpret and were not always confirmed by subsequent *post-mortem* examinations.—R. E. Glover.

Gloyne, S. R. (1932). **Tuberculin Diagnosis.**—*Bull. Hyg.* **7.** 329-335. [29 refs.]

—. (1932). **The Value of Tuberculin Tests in Man.**—*Brit. Med. J.* April 16th. 715-716. [2 refs.]

—. (1932). **Use of Tuberculin in Diagnosis.**—*Lancet.* **222.** 521-522. [5 refs.]

These three articles all deal with the diagnostic value of tuberculin in man. The intradermal method is accepted as the most reliable means of applying the test. The standardization of tuberculin is very desirable and, until some improved method is found, discordant results are inevitable. The intradermal test should be a valuable adjunct to early diagnosis in children, at which time a positive reaction is most likely to be associated with active disease. The test, however, does not differentiate between infection and benign tuberculous disease. Statistics tend to show that non-reactor children are more likely to contract active disease in later years than healthy reactor children. The use of X-ray chest examinations is suggested in positive reactor children.—NORMAN HOLE.

HORSTER, & HÄMEL. (1932). Zur Serodiagnostik der Tuberkulose. Erfahrungen mit den Reaktionen nach Lehmann-Facius-Loeschcke, nach Neuberg-Klopstock und nach Witebsky, Klingenstein und Kuhn. [**The Serodiagnosis of Tuberculosis. Experiences with the Reactions of Lehmann-Facius-Loeschcke, of Neuberg-Klopstock and of Witebsky, Klingenstein and Kuhn**].—*Zlb. Bakt. I. (Orig.).* **127.** 79-82.

The delay in the introduction of the serodiagnosis of tuberculosis is not due to a lack of choice in methods, but rather to the fact that it is still difficult to interpret precisely the serological findings. Advance in this direction can only be made if the serological work is carried out in close conjunction with clinical observations. The authors, in this paper, compare three methods for the serodiagnosis of tuberculosis in the human subject. One method depends upon the precipitin reaction and the other two upon the complement-fixation test. Of these, the complement-fixation method of Witebsky, Klingenstein and Kuhn, appears to give the most satisfactory results. This method, when applied to a series of patients suffering from pulmonary tuberculosis, gave positive results in 77 per cent. of the cases, whereas the method of Neuberg-Klopstock only gave 30 per cent. positive reactions with serum from the same patients.

Although the serodiagnosis of tuberculosis is only beginning, the author considers that it is of value for diagnosis in the early stages of the disease.

—A. J. WILSDON.

SHIMIDZU, T. (1932). Ueber Hämagglutination bei Tieren. II. Mitteilung: Heteroagglutination. [**On Haemagglutination in Animals. II. Hetero-Agglutination**].—*Tohoku J. Exp. Med.* **18.** 526-539. 4 tables. [24 refs.]

The hetero-agglutinability and the agglutinability of animal blood varies according to the animal. Blood cells from rabbits, pigs, hens and toads are strongly agglutinable, those from cows and sheep, weakly, or not at all. Toads' serum has no agglutinin for the blood of any of the other animals which were examined. Hetero-agglutinins for pigs' blood only were present in guinea pig serum. Agglutinability at 0° and at 37°C. generally ran parallel, but was more marked at 0°C. At this temperature the heterologous agglutinins were divisible into two kinds, one specific, another non-specific. Sera from horses, pigs and dogs contained specific agglutinins for the blood of all the other species examined. Sera from rabbits, cows, hens and sheep had common elements with two or more other kinds of blood only.—A. W. STABLEFORTH.

BORDET, J., & RENAUX, E. (1933). Sur les sérums antilytiques. [**Antilytic Sera**].—*Ann. Inst. Pasteur.* **50.** 299-305. [3 refs.]

Since the demonstration of rough and smooth types of *Bact. coli*, it has been

shown that two lytic factors are present. One, the weak lytic factor, exercises lytic properties on the smooth type of *Bact. coli* only, whereas the other, the strong lytic factor, is capable of producing lysis in both smooth and rough types.

For the study of this lytic phenomenon, cultures of *Bact. coli* containing equal proportions of rough and smooth colonies were filtered and the filtrate injected into rabbits. The animals were bled at the end of a week and the serum heated for 30 minutes at 56°C. Sera obtained in this manner were found to be capable of neutralizing either the weak lytic factor or the strong lytic factor only, whilst some neutralized both the lytic factors. It was thought that the filtration of the culture before injection might play some part in the failure of one or other antilytic factor to develop. To test this point several 2 c.c. doses of a culture of *Bact. coli* were injected without previous filtration into a rabbit and it was found that the serum possessed antilytic properties against both rough and smooth types of *Bact. coli.*

Since antilytic serum still retains its properties after heating to 56°-60°C. and since it was seen from the experiments carried out by the authors that the lytic factor appears capable of being absorbed by bacterial debris, they are unable to accept the view that this factor is a virus bacteriophage.—A. J. Wilsdon.

Achard, C., Boutaric, A., & Morizot, F. (1932). Sur une méthode d'étude des sérums d'après leur action sensibilisatrice dans la flocculation de l'hydrate ferrique. [**A Method of examining Sera by their Sensitizing Action on the Flocculation of Ferric Hydroxide**].—*C. R. Acad. Sci. Paris.* **195.** 9-11. 2 tables.

The addition of diluted normal horse serum (or solutions of serum proteins prepared by acetone precipitation) to a mixture of potassium nitrate and colloidal ferric hydroxide will reduce the time of flocculation of the latter from 60 to about 21 minutes. If the serum is first heated the acceleration of flocculation is less. Various therapeutic sera (antidiphtheria, antitetanus, antipneumococcus, etc.) also accelerate flocculation, the times obtained varying from 25 to 32 minutes with a control flocculation time of 60 minutes.—W. R. Wooldridge.

I. Golowitzina, K. A. (1931). Ueber eine noch unbekannte Funktion des retikulo-endothelialen Systems. XIII. Ueber die Rolle des retikuloendothelialen Systems in dem oxydierend- reduzierenden Prozessen des Organismus, anknüpfend an chemotherapeutische Probleme. [**On a yet Unknown Function of the Reticulo-Endothelial System. XIII. On the Role of the Reticulo-Endothelial System in the Oxidation-Reduction Process of the Organism, and their Bearing on Chemo-Therapeutic Problems**].—*Zschr. Immun.-Forsch.* **71.** 541-549. 5 tables. [9 refs.]

II. Schamburow, D. A. (1932). Der Einfluss der Blockade des retikuloendothelialen Systems auf die Antikörperbildung im Subarachnoidalraum. [**The Influence of Blockade of the Reticulo-Endothelial System on the Production of Antibodies in the Subarachnoidal Space**].—*Zschr. Hyg. u. Infektkr.* **113.** 700-708. 5 tables. [2 refs.]

III. Dwolaizkaya-Baryschewa, K. M., & Kagan, N. W. (1932). Von der Bedeutung der Retikulo-endothelialapparates bei Infektionskrankheiten. VIII. Zur Frage über die Rolle des Retikuloendothelialsystems bei Infektionen mit B. paratyphi, B. Schottmülleri und B. typhi abdominalis. [**On the Significance of the Reticulo-Endothelial System in Infectious Diseases. VIII. On Questions regarding the Role of the Reticulo-Endothelial System**

in Infection with *Bact. paratyphosum, Bact. schottmülleri* **and** *Bact. typhosum*. —*Zschr. Immun.-Forsch.* **73.** 429-443. 11 tables. [6 refs.]

I. In splenectomized or blockaded mice the reducing properties of liver, spleen, muscle, kidney and lung are not decreased. The same cell complexes do not therefore come into play in the activity of the reticulo-endothelial system as in the oxidation-reduction processes of the organism.

II. Preliminary subarachnoidal introduction of trypan blue and collargol in rabbits immunized by the same route led to a partial or complete inhibition of agglutinin and haemolysin production. Trypan blue affected both the agglutinin and haemolysin titres, collargol only the haemolysin titre. Intravenous injection had no effect.

III. The activity of the reticulo-endothelial system as a blocking agent in infection of white mice with *Bact. paratyphosum*, *Bact. schottmülleri* and *Bact. typhosum* depends upon the route of infection. In oral infection its activity is weak, in subcutaneous infection it is marked.—A. W. STABLEFORTH.

DISEASES, GENERAL.

I. —. (1932). **Human Disease in Animals.**—*Lancet.* **223.** 217.

II. SENDRAIL, J. (1932). Les animaux victimes des maladies humaines. [**Animal Victims of Human Diseases**].—*Rev. vét. et J. Méd. vét.* **84.** 524-536.

I. In dealing with wild animals in captivity, it is stated that certain groups of animals appear to be immune to some of the common human diseases. Animals other than anthropoid apes do not suffer from the common cold and, although dysentery may be common, *Bact. shigae* may never be found although a member of the paratyphoid group or *Bact. morgani* can sometimes be demonstrated. On the other hand, tuberculosis appears to infect practically all animals. It is stated that the incidence of this disease has fallen amongst monkeys since the introduction of sterilized tinned milk in place of fresh milk.

Hedgehogs are said to develop rickets in captivity although it is unknown amongst them in the wild state. Cod liver oil fails to effect a cure.

II. A presidential address given before the Medical, Surgical and Pharmaceutical Society of Toulouse and dealing with animals which become victims to human disease. Although domestic animals may be carriers of disease which may affect human beings, the reverse may also occur. Domestication, because of the abnormal conditions under which the animals live, may be a contributory cause of certain conditions. The author cites various bacteriological diseases which may spread amongst animals by human agency. He cites staphylococcal, streptococcal, and brucella infections under this heading. Tuberculosis in carnivores is stated to have increased in the last 20 years. This is especially so in dogs which appear to be more frequently affected with the human type of tubercle bacillus than with either of the other types. Rift valley fever and various parasitological conditions are mentioned in the author's attempts to show how dangerous for animals is their association with man.—R. LOVELL.

I. ULM, E. (1932). Bodenkrankheiten bei Weiderindern und Schafen in der Provinz Brandenburg unter Berücksichtigung ihrer Abhängigkeit vom Untergrunde. [**Earth-Borne Diseases of Cattle and Sheep in Brandenburg**]. —*Inaug. Diss. Berlin.* pp. 99. 11 tables. [10 pp. of refs.]

II. STAMPA, W. (1932). Bodenkrankheiten bei Weiderindern und Schafen in

der Provinz Pommern unter Berücksichtigung ihrer Abhängigkeit vom Untergrunde. [**Earth-Borne Diseases of Cattle and Sheep in Pomerania.**] —*Inaug. Diss. Berlin.* pp. 35. 3 tables, 5 maps. [43 refs.]

I. Ulm set out to assess the importance of earth-borne infection in the province of Brandenburg in the incidence of certain cattle and sheep diseases described by various authorities as " Bodenkrankheiten." These include anthrax, blackquarter, haemorrhagic septicaemia, distomatosis, lungworm disease, stomach worm disease, bovine redwater (piroplasmosis) and warble fly parasitism. The work involved a study of the local geology, the composition of the soils and rainfall, etc. of the province, a review of veterinary literature and a survey of disease statistics prepared in recent years by various authorities.

Much information has been collected under the headings of disease and of geographical districts, and from the evidence obtained the number of cases of disease attributable to earth-borne infection is roughly assessed. The author concludes that this factor is of very slight importance in anthrax, blackquarter and haemorrhagic septicaemia. The other diseases named above do appear to have some connection with the type of soil and climate.

II. Stampa makes a similar survey of those earth-borne diseases occurring in the province of Pomerania—anthrax, blackquarter, distomatosis and bovine redwater (piroplasmosis) ; their incidence is shown on the maps provided, as also is the geological character of the province. The author draws no conclusions on the importance of earth infection and offers his work, as Ulm does also, as a basis for future investigation of a similar nature.—J. E.

Turner, H. W. (1932). **The Handling and Medication of Sheep with Special Reference to Common Diseases.**—*Cornell Vet.* **22.** 109-123. 1 photograph. [Presented at the Annual Veterinary Conference of New York State Veterinary College, Cornell University, Ithaca, New York, Jan. 14th-15th, 1932].

This paper is intended for veterinary surgeons who have not hitherto had an opportunity of becoming familiar with the handling and treatment of sheep. Terms relating to sheep husbandry used by farmers are explained, and dentition, breeding and disease are dealt with. The author describes a rack calculated to prevent the soiling of lambs' food by faeces from adult sheep.—R. S. Roberts.

Reid, H. A. (1932). **Some Ailments of Sheep in New Zealand.**—*Vet. J.* **88.** 157-162.

The author describes the geographical, geological and climatic conditions of New Zealand with their bearing on animal production, and briefly describes certain diseases of sheep, among them " bush sickness " (iron deficiency), brittle bone disease or osseous cachexia (lime deficiency), black disease, puerperal diseases of ewes, pulpy kidney disease, polyarthritis of lambs, caseous lymphadenitis and parasitic diseases.—J. E.

Michalka, J. (1932). Beitrag zur Epidemiologie der Wildkrankheiten. [**Contribution to the Epidemiology of Diseases of Game**].—*Wien. tierärztl. Mschr.* **19.** 609-616. [11 refs.]

This is a summary of the results of the diagnostic *post-mortem* work of the station for diagnosis of animal diseases at Mödling near Vienna. [Bundesanstalt für Tierseuchenbekämpfung, Mödling bei Wien].

In 1931 nearly 900 game and other wild animals, or specimens, were sent for

diagnosis and over 200 cases of disease in fur-bearing animals were also diagnosed. The results are given under headings according to the aetiology of the conditions.

Coccidiosis was the only protozoan invasion encountered, chiefly in hares and rabbits, although the deaths of four minks and one nutria were also ascribed to this cause. Worm infestations were common and several species of tapeworms and roundworms as well as *Fasciola hepatica* were found in many species of host [too detailed to include here].

Mange was found in 13 chamois and two foxes, nasal bots in 25 roe-deer and four stags, *Hypoderma diana* in five roe-deer and trichodectes lice in one deer.

Of virus diseases, swine fever was found in three wild pigs, fowl pox in two pheasants and a partridge, fowl plague in a sparrow (caught in the pen containing infected fowls) and distemper in two foxes.

Of bacterial diseases, anthrax was found in deer and a fox at a time when an anthrax epidemic was occurring in herds of cattle in the same neighbourhood. Malignant oedema was found in one stag. Haemorrhagic septicaemia was diagnosed in six deer, one stag, six rabbits, and in four wild fowl. Tuberculosis was diagnosed in a captive ape and in a wild deer. Pseudotuberculosis was common in game animals, either alone or coincident with helminthiasis ; staphylomycosis was seen in wild rodents and mycotic pneumonia in deer and hares. Reference is also made to certain other infections.

The statistical section of the paper is concluded with interesting notes on non-infectious conditions in wild animals. Neoplastic growths of various kinds were not uncommon, both benign and malignant tumours being observed.

The author concludes his pages with a general note on the epidemiology of the diseases of game animals.

It appears that helminthiasis is of most importance—particularly strongylosis, pulmonary species in wild ungulates and gastric species in wild rodents.

Bacterial diseases usually occur only in animals previously weakened in any way, pseudotuberculosis being the commonest. Virus diseases among game animals are unimportant and when they occur usually represent a transmission from domestic animals of the same zoological family.—J. E.

Tschistowitsch, A. N. (1932). Aseptische Entzündung bei lokaler Blockade des R.E.S. [**Aseptic Inflammation along with Localized Blockade of the Reticulo-Endothelial System**].—*Beitr. path. Anat.* **88.** 426-432. 1 plate. [7 refs.]

Previous workers (Aschoff, Petroff and others) have shown that, in the so-called blockade of the reticulo-endothelial system, it is not possible to abolish completely the respective functions of the reticulo-endothelial system by the injection of colloidal dyes. The author injected trypan blue subcutaneously into rabbits and five days later inserted a small piece of sterile sponge into the same area. Tissue from this area was examined histologically at intervals later. It was shown that polymorphonuclear leucocytes, containing no dye, infiltrated very quickly into the sponge and the direct neighbourhood ; that the latter area became necrotic and was soon bordered by histiocytes containing the dye ; that foreign body giant-cells only appeared in the later stages of the process (14 days). A month later, the foreign body was engulfed by granulation tissue. Similar experiments with Indian ink showed slight variations in the reaction. Localized injection of trypan blue caused blockage of the reticulo-endothelial system against later intravenous injections of Indian ink, but local injection of Indian ink did not prevent the histiocytes from taking up trypan blue from the circulating blood.

—J. R. M. Innes.

I. Fish, E. W. (1932). **The Aetiology of Dental Caries.**—*Brit. Med. J.* Oct. 22nd. 747-749. 2 figs. [8 refs.]

II. Mellanby, May. (1932). **The Aetiology of Dental Caries.**—*Ibid.* 749-751.

I. The author considers that the evidence points to caries being a saprophytic phenomenon occurring in morphological fissures and developmental enamel faults of the teeth. Its occurrence cannot be prevented by vital reactions on the part of the formed tooth although its extension may be delayed. Prevention can be carried out by rendering the mouth unsuitable as an environment for the saprophytes concerned or by breeding a race free from morphological cavities or developmental enamel faults. The types of clinical fissures are described. Avitaminosis is not considered to be an important factor in aetiology.

II. This paper is a brief summary of the results of many years experimental work on dogs and clinical work on human beings. [Further reference can be made to the excellent detailed reports by the author—(1931). *Med. Res. Council, Spec. Rep. Ser.* No. 159]. The main contentions by the author are :—that fat-soluble vitamins are essential for the proper calcification of the teeth and the consequent resistance to disease ; that the structure of the teeth is a factor of the highest importance, and that the latter depends upon the diet during the period of growth. Hypoplasia of the enamel renders the teeth susceptible to caries. The presence of a correct balance and quantity of calcium and vitamin D in the diet during the growth period is necessary to ensure good tooth structure and development.—J. R. M. Innes.

I. Détrez, G. (1932). Contribution à l'étude de la paraplégie ante partum et de la maladie du chemin de fer chez la vache. [**Contribution to the Study of** *Ante-partum* **Paraplegia and Transit Fever in the Cow**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 78. 2 tables. [18 refs.]

II. Détrez, G. (1932). Paraplégie ante partum et maladie du chemin de fer de la Vache. [*Ante-partum* **Paraplegia and Transit Fever in the Cow**].—*Rec. Méd. vét.* **108.** 409-416.

III. Godet. (1932). La tétanie d'herbage. [**Grass Tetany**].—*Ibid.* 737-739. 1 table.

IV. Détrez, G. (1933). Tétanie d'herbage et maladie du chemin de fer. [**Grass Tetany and Transit Fever**].—*Ibid.* **109.** 144-149. 1 table.

I. While in Germany the author studied the cause of *ante-partum* paraplegia in cows. He was not concerned with atypical cases which he called " atypical *ante-partum* paraplegia," his work being the study of true *ante-partum* paraplegia. He gives a table distinguishing between the symptoms of this disease and similar diseases of gestation. On examination of the blood the author noted an increase in the amount of guanidine present. The similarity of parathyroid deficiency and guanidine toxaemia is mentioned. Several experiments are described and tables of analyses of urine and blood are given. The examination of the blood in cases of *ante-partum* paraplegia and transit fever showed an increase in the quantity of guanidine and the symptoms in these cases were similar to those noted when guanidine in large amounts is present in the blood. The treatment consisted in neutralization of this guanidine by calcium salts. Extracts of parathyroid were also given and, as the author thought that the toxaemia was of placental origin, he gave methylene blue in the food or subcutaneously. The author concludes that the cause of *ante-partum* paraplegia is an increase of guanidine in the blood.

II. The author mentions various causes referred to by previous observers. He believes that there are two forms of *ante-partum* paraplegia, one which he calls " false *ante-partum* paraplegia " and the other " true *ante-partum* paraplegia." In

all cases studied, the author noted certain causes, such as plethoric state, heat, muscular overwork and endometritis ; symptoms of tetany, sweating and hypertension of the arterioles were always noted. He mentions biochemical research work on diseases of gestation carried out by other authors. Blood analysis showed the presence of large quantities of guanidine ; the action of this substance in normal blood and the effects of an increased quantity are explained, one effect of importance being the alteration of the mineral content of the blood. The toxaemia he believes to be of placental origin. Treatment consists of the neutralization of guanidine by calcium salts, the treatment of parathyroid insufficiency (which was also noted in these cases), by extracts of parathyroid, and placental treatment by the administration of methylene blue in the food or intravenously. The author concludes that paraplegia and transit fever are the result of toxaemias of placental origin. The guanidine normally altered by the muscles is not decomposed in these cases into creatinine, but accumulates in the blood causing the symptoms stated.

III. Consists of a clinical record of several cases of grass tetany. The disease appears to be severe with good milkers which, during the winter, had food very different from pasture grass. It appears most frequently during periods of oestrus. Calcium gluconate and udder inflation are recommended as the most efficacious treatment. It is stated that cases are more numerous in the year following a harvest normal in quantity but deficient in quality, such as during the rainy season.

IV. Five cases of grass tetany and four of transit fever are described, the symptoms in both being similar to those of guanidine toxaemia. Nervous symptoms with poisoning of the nerve centres were noted ; the appetite was affected and there was variable tetany which was sometimes very noticeable, the membrana nictitans even covering the eyeball. This was followed by clonic contractions. Secondary symptoms observed were sweating and vasoconstriction of peripheral blood-vessels. The causes in both cases are the same—a plethoric state, muscular over-activity and an increase in temperature. For treatment, calcium salts are given, large doses being required.—R. G. Linton.

I. McCarrison, R., & Madhava, K. B. (1932). **The Life Line of the Thyroid Gland. A Contribution to the Study of Goitre.**—*Ind. Med. Res. Memoirs.* No. 23. pp. 378. 34 figs., 57 tables, 1 appendix. [64 refs.]

II. —. (1932). **The Aetiology of Goitre.**—*Lancet.* **223.** 408-409.

I. This is a memoir amplifying the earlier report on " Aetiology and Epidemiology of Goitre," written for the Berne Congress of 1927 and reprinted as an appendix to the present volume. Most of the new material is based upon the experimental work (white rat) of the senior author, the statistical analyses of the accumulated data being made by Madhava.

Successive chapters deal with mode of growth of the thyroid gland ; thyroid-size (designated by " r," a ratio of organ-weight to body-weight) ; modification of the actual and relative thyroid-weight by diet ; effects of sex, sexual activity, season and sanitary condition on the thyroid gland ; relation of iodine to the thyroid ; goitre surveys and iodine prophylaxis ; aetiology of goitre.

The memoir contains too much statistical matter to abstract in detail but the main views of the author may be presented as follows :—

(1) In early life the thyroid gland grows more rapidly than the body as a whole, attains its maximum weight just before puberty and then gradually diminishes in size in both sexes, remaining at a relatively low level in males, but in females exhibiting secondary rises associated with reproductive activity. It is for this definite course of development that the author uses the term " life line."

(2) The causes of goitre are manifold and include hereditary, physiological, psychic, hydro-telluric, nutritional, sanitary and microbic influences.

(3) The most important cause is faulty diet and the faults may be :—(a) excess of certain substances, such as fats, fatty acids, and calcium relatively to phosphorus ; (b) deficiencies of certain substances, such as vitamins (particularly A and C but probably also B), iodine and phosphorus relatively to calcium, and (c) excess of certain goitre-producing substances in certain food materials. Positive goitrogenic substances of this last class have been shown to occur in cabbage, ground-nuts, bran and maize, but they do not cause goitre unless the materials containing them are present in the diet in relatively large amount. On the other hand, certain food materials can be classified as anti-goitrogenic e.g. grass, certain green vegetables (other than cabbage), oatmeal, carrots and sprouted gram (legume).

(4) Next in order of importance are insanitary conditions of life involving contamination of food and drink by excreta. With a perfect diet, however, insanitary condition has no goitrogenic action and the effect is, therefore, attributed to the balance between systemic infection and anti-infective agents such as vitamin A.

(5) Iodine deficiency is placed third and although its significance is realized it is considered that much past research has dealt with iodine too exclusively. A low iodine intake, although favourable to goitre, generally produces its effect in association with a diet also deficient in other respects and there is a lymphadenoid type of goitre which can arise despite adequate ingestion of iodine. The effect of iodine is most noticeable just before puberty when the gland is enlarging and requirements are highest.

(6) Amongst antigoitrogenic agents, other than iodine, vitamins and specific foodstuffs, are mentioned :—(a) sodium phosphate when dietary calcium is too high ; (b) thyroxine in cases of " cabbage goitre " ; (c) thymol when the causal agent is operating at the intestinal threshold ; (d) manganese chloride against the agent causing lymphadenoid goitre in rats fed on vitamin-deficient diets, and against the agent in cabbage which causes hyperplastic goitre in rabbits and rats.

II. This is an annotation of I.—H. H. Green.

Svanberg, O. (1933). Om bristsjukdomar hos husdjuren, direkt eller indirekt sammanhangande med bristfällig mineralämnesförsörjning. [**On Deficiency Diseases in Domestic Animals directly or indirectly connected with Mineral Shortage in the Food**].—*Svensk. Vet.-tidskr.* **38.** 79-92. 2 figs.

Deficiency diseases account for considerable loss to farmers, from lack of growth, milk production and work.

Of the 90 chemical constituents of the soil, only 34 are necessary for the growth and health of plants and animals ; perhaps several of these are only necessary in small quantities and others are only occasional guests in the body without function or use.

The most important minerals are phosphorus and calcium compounds. Experimental feeding with diets deficient in lime and salt has given very inconsistent results in healthy animals. This may be due to the reserves of these substances in the body. Conditions related to these deficiencies are :—

Calcium deficiency.—Tetanic spasms and rickets in pigs ; milk fever and reduction in milk yield in cattle. Rickets and osteomalacia do not occur in cattle in Sweden.

Iron deficiency.—Iron deficiency is chiefly seen in suckling pigs, especially those kept in cement sties ; this is characterized by anaemia, with or without stunting of growth.

PHOSPHORUS DEFICIENCY.—In milch cows, skeletal disturbances occur with lameness, accompanied by brittleness of the bones, changes in posture, gait and contour of the body. Rickets is common in bull calves. In horses similar conditions are seen with considerable bone degeneration, and rickets occurs in foals and colts. Phosphorus deficiency occurs mostly in animals which are reared on boggy ground.

For the prevention of deficiency disease, the author recommends the more general use of phosphatic manures on the pastures, the addition of soluble phosphates to the feed and the earlier and better harvesting of the hay crop, which, in bad seasons, may lose a considerable percentage of its mineral content during the process.

DEFIENCY OF POTASSIUM, SODIUM, CHLORINE, SULPHUR, IODINE OR PROTEIN.—There are no disease conditions in Sweden due to deficiency of these essential food constituents.—A. A. FORSYTH.

MCINTOSH, R. A. (1932). **Mineral Deficiency Diseases.**—*Vet. Med.* **27.** 150-154.

A general article discussing mineral deficiencies in domesticated animals—without detailed protocols but including Canadian experience.

The author regards all domestic animals as liable to suffer from dietary deficiency of calcium and phosphorus, but on Ontario farms cattle and pigs are most frequently affected and deficiency of phosphorus is probably more common than deficiency of calcium. Symptoms are unthriftiness, depraved appetite, reduction of milk yield, and, finally, osteomalacia and rickets. Depletion of mineral reserves of the body occurs after the pasturing period under conditions of stall feeding.

In pigs, rachitic symptoms may develop at 6 to 12 weeks old and a form of tetany sometimes occurs, which the author regards as prodromal of bone disease. Adult pigs are less affected but a form of posterior paralysis in sows is attributed to mineral deficiency. Iodine deficiency is discussed as characteristic of certain geographical districts, the provinces bordering on the Great Lakes being most affected. The author refers to " hairless pig malady " [foetal athyrosis] and to a similar disease in lambs. In foals and calves, mortality is lower but the animals do not thrive and show " big neck " or enlarged thyroid gland. In all cases prevention is assured by feeding iodized salt to the dams—about 4 oz. of potassium iodide to every 100 lb. of common salt provided for the animals.

Iron deficiency is discussed in relation to anaemia of young pigs, a disease most marked at about two weeks old. Individual dosing with reduced iron is recommended, but the introduction of earth sods (preferably sprinkled with charcoal and an iron compound) into the pen may serve the purpose. Where mineral deficiencies are suspected a general mixture is suggested. For cattle a mixture of ¼ lb. potassium iodide, 3 lb. of salt, 10 lb. of chalk, made up to 100 lb. with bone meal is added to the grain ration at the rate of 4 lb. per 100 lb. of grain. For pigs a mixture of charcoal 4 bushels, iodized salt 10 lb., bone meal 10 lb., sulphur 2 lb. and iron sulphate 1 lb., is placed in self feeders as a lick.

[In British piggeries, calcium carbonate is used instead of bone meal as being cheaper and better calculated to balance out the high phosphorus of the grain ration—usually about 2 per cent. of ground limestone and 1 per cent. of salt]. —H. H. GREEN.

PUBLIC HEALTH.

I. Davis, D. J. (1932). **Epidemics of Septic Sore Throat of Milk Origin : Present Status of Bacteriology and Epidemiology.**—*J. Bact.* **23.** 87-88.
II. Frost, W. D. (1932). **Carriers of Streptococcus Epidemicus.**—*Ibid.* 88-90. [Papers read at 33rd Annual Meeting of the Society of American Bacteriologists].

I. A concise summary. Streptococci classed as scarlet fever or erysipelas organisms may develop the characters of *Str. epidemicus*.

II. Of about 4,750 throat cultures from 750 persons (four years period), 19 showed *Str. epidemicus*. One of the infected persons, the milker of the cow incriminated in the Baraboo epidemic, probably had typical septic sore throat, two others had mild tonsillitis. The remainder showed no symptoms although one at least was probably responsible for an epidemic.

Of about 10,000 samples of milk from 3,000 cows, eight showed *Str. epidemicus*. One cow had mastitis at the time, and three developed a mild mastitis later, whilst the other four only showed slight changes.

Apart from the above examination, which was made specifically for carriers of *Str. epidemicus*, 58 additional infected cows in 17 herds were detected in the course of the examination of mastitis secretion.—A. W. Stableforth.

I. Skar, O. (1932). Undersøkelse over melkens innhold av dyriske celler. **[Investigation on the Content of Animal Cells in Milk].**—*Skand. Vet.-tidskr.* **22.** 19-20.
II. Larsen, E. (1932). Kvalitetsbetalingens Indvirkning pas Maelk der leveres til Köpenhavn. **[The Effect of Payment by Quality on Milk sold in Copenhagen].**—*Ibid.* 245-253. 1 table.

I. The author emphasizes that in chronic mastitis caused by streptococci the leucocytes in the milk become so loaded with fat that, after centrifugation, most of them are found in the cream-layer. To get a proper conception of the quantity of the sediment it is advisable to make two centrifugations. After the first centrifugation, the milk, but not the cream, is removed from the centrifuge tube. The tube is then filled with about 5 c.c. of alcohol of approximately 32 per cent. by volume : the cream is mixed with this by shaking and the tube is again centrifuged ; the leucocytes are then found at the bottom of the tube. Material to be used for microscopic examination should be taken from the lowest layer of the tube, as this layer is the richest in streptococci.

II. Most of the milk sold in Copenhagen is paid for according to its quality. In 1919 a system of payment according to the fat percentage was introduced, and in 1924 the reductase fermentation test was added as a basis for fixing prices. An official milk-quotation commission determines the basic price each week for milk containing 3·35 per cent. of fat and for milk designated Class I as a result of the reductase test.

There are four classes of milk :—for Class I, the reduction time is greater than 5½ hours ; for Class II, from 2½ to 5½ hours ; for Class III, from 20 minutes to 2½ hours, and for Class IV, below 20 minutes.

Milk containing more than 3·35 per cent. of fat has a higher price than that which is standard for the class, and milk with a fat content of below 3·35 per cent. fetches a lower price.

The price of Class II milk is ¾ öre (about 1/8 of a penny) per kg. less than that of Class I milk and Class III milk costs 2 öre less per kg. than Class I milk. As a result of the introduction of these measures, the average fat percentage of

the milk sold is now 3·65 per cent. and the quality and resistance of the milk to souring have improved considerably.

In 1924, 55 per cent. of the milk sold was of the Class I grade ; in 1931 this figure had risen to 88·13 per cent. In 1924, unsatisfactory reductase tests were obtained in 10 per cent. of the samples examined, but in 1931 this figure was only 0·4 per cent.—N. LAGERLÖF (STOCKHOLM).

I. MINKEWITSCH, J. E. (1932). Zur Bestimmung des Coliaerogenestiters in Milch. [**On the Estimation of Coli-Aerogenes in Milk**].—*Zlb. Bakt. I. (Orig.).* **125.** 125-128. 1 table. [5 refs.]

II. SCHMIDT, W. (1932). Untersuchungen über den Coligehalt roher und dauererhitzter Milch. [**Experiments on the Coliform Content of Raw and Pasteurized Milk**].—*Zschr. Fleisch- u. Milchhyg.* **42.** 158-161. [3 refs.]

III. EHRLICH. (1932). Die häufigsten Ursachen des hohen Keim- und Koligehalts in der Vorzugsmilch und deren Beseitigung. [**The Most Frequent Cause of High Bacterial and Coliform Content in Graded Milk and Means for Avoiding them**].—*Deuts. tierärztl. Wschr.* **40.** 699-702. [3 refs.]

I. The Kessler-Swenarton medium or the author's modification (gentian-violet-milk-broth) is recommended for the estimation of coli-aerogenes in milk. The significance of the count is questioned because the coli-aerogenes flora of milk differs markedly from that of faeces.

The Kessler-Swenarton medium is a bile-lactose medium containing 1 : 25,000 of gentian-violet.

II. Schmidt concludes from the examination of 139 samples of pasteurized milk from 12 dairies, 160 samples of raw milk from 9 herds and 100 milk samples taken at various stages of the handling processes, that the contamination of milk with coliform organisms is due chiefly to insufficient cleaning of the apparatus used in handling the bottles. The trypaflavin brom-thymol-blue lactose agar plate method is preferred to the corresponding broth medium or other broth media. Only 3·6 per cent. of pasteurized samples were free from coliform bacteria.

III. Ehrlich concludes from the examination of samples of milk taken at various stages that both a high bacterial count and contamination with coliform organisms are due not to infection in the byre, but to faulty handling.

[Both Schmidt and Ehrlich recommend that all apparatus used in handling should not only be well cleaned, but treated with a suitable disinfectant such as " Neomoscan "].—A. W. STABLEFORTH.

TROUT, G. M. (1932). **Sources of Some Abnormal Flavors in Milk.**—*Michigan State Coll. Quart. Bull.* **14.** 141-142.

This is a report of 122 samples of milk brought in for examination on account of undesirable flavours. The causes were found to fall into four distinct groups. These were (a) an advanced stage of lactation in one or more cows ; (b) feeding on strongly flavoured foods shortly before milking ; (c) improper cooling of milk and (d) either poor pasteurization equipment or poor pasteurization. In one instance, in a sample of milk from 11 cows, one animal was found to have been in continuous milk for 23 months ; her milk was proved to be the cause of the flavours and when it was excluded from the bulk the flavour ceased. In another case the copper of the recording thermometer arm of the pasteurizer came into contact with the milk, the tin having been worn off, and this was found to be the cause of the taint.—D. S. RABAGLIATI.

Wyman, E. T., & Butler, A. M. (1932). **Antirachitic Value of Milk from Cows Fed Irradiated Yeast.**—*Amer. J. Dis. Child.* **43.** 1509-1518. 2 plates, 5 tables. [8 refs.]

Experiments of Thomas and MacLeod have already shown that, by feeding cows on 30,000 to 60,000 rat units of irradiated yeast daily, milk high in antirachitic qualities is produced. The authors in this paper described the healing qualities of "yeast milk." It was thought better to include antirachitic factors in the food of the children rather than as a separate therapeutic agent.

Experiments were tried on two infants and two children suffering from advanced rickets. The authors being satisfied that healing was not taking place as ascertained by roentgenograms, special "yeast milk" was given to them instead of ordinary milk. Certified milk was used and, in addition to the usual diet, the cows were fed on 60,000 rat units of irradiated yeast daily. In three cases the milk was pasteurized only, but in the fourth it was boiled for five minutes after being pasteurized. Roentgenograms were taken of the long bones before and during treatment and the process of healing recorded. Deposition of bone could be seen in two weeks after the administration of the pasteurized milk and this also resulted in a rise in the serum-phosphorus and a marked increase in the calcium-phosphorus product. In the case of the child fed on the boiled milk, healing also took place, but not so quickly.—D. S. Rabagliati.

I. Frank, L. C., Clark, F. A., Haskell, W. H., Miller, M. M., Moss, F. J., & Thomas, R. C. (1932). **Do Children who drink Raw Milk thrive better than Children who drink Heated Milk?**—*Publ. Health Rep. Washington.* **47.** 1951-1960. 5 figs., 1 table.

II. —. (1932). **Properties of Heated and Raw Milk.**—*Brit. Med. J.* Nov. 5th. 849.

I. In an endeavour to disprove the assertions of those in favour of raw milk, the authors arranged to carry out comparative tests in 39 American cities. The statistics were derived from a questionnaire and details were considered from more than 3,300 children between the ages of two and six years. As it was found that the number of children who had received no heated milk at all was so small, it was decided to place in the raw milk group those children who had received no heated milk for more than half their lives, and in the heated milk group those who had received heated milk for more than half their lives.

The following conclusion was arrived at :—"The growth-promoting capacity of heated milk plus the supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth-promoting capacity of raw milk plus the supplementary diet received by the average American child of 10 months to 6 years." It is also claimed that the raw milk group suffered more from diseases such as diphtheria, scarlet fever, intestinal diseases and rickets.

II. This is an annotation of I.—D. S. Rabagliati.

Kammel, & Riedel. (1932). Untersuchungen über die Dauer der Verwendbarkeit des Blutes von Schlachttieren. [**The Length of Time Blood of Slaughtered Animals will remain Fit for Use**].—*Tierärztl. Rdsch.* **38.** 293-297 and 313-318. 5 tables. [5 refs.]

After a review of the scanty literature on the subject, the results of five series of experiments are described which lead to the following conclusions :—

(1) With a high storage temperature and high initial germ-content, the blood of cattle and pigs can be considered as fit for human consumption on the day of its production only, unless special preservative measures are taken.

(2) The duration of the keeping quality of the blood is in the main dependent upon three factors :—(a) the storage temperature ; (b) the bactericidal forces and (c) the addition of common salt.

(3) The temperature of the storage place is of the utmost importance. Blood which is taken at the earliest possible moment on the day of its production to the cooling chamber can, even with a fairly high initial germ-content and without the use of chemical preservatives, be pronounced as usable after the lapse of eight days. With an addition of 3 to 5 per cent. of common salt the period may be doubled.

(4) Having regard to the generally adopted hygienic rules for dealing with perishable foodstuffs, the initial germ-content of the blood is not of outstanding importance.

(5) The determination of the number of bacteria may be of assistance in judging the usability of the blood, but the intensity of the germ-content is not in every case a reliable indicator of the degree of decomposition. The practical importance in veterinary food inspection to be attributed to the onset of the thin layers of muddy carmine-red tint requires further research.

(6) Putrefied blood cannot be refined by adding common salt.—F. BULLOCK.

THERAPEUTICS.

DALE, H. H. (1932). **Some Therapeutic Problems of the Future.**—*Pharmaceut. J.* **129.** 515-517 and 534-536. [The Harrison Memorial Lecture 1932].

The modern trend of therapeutics and preventive medicine leaves little doubt that many drugs of vaguer action in the relief of symptoms will be dispensed with, only those with a specific action and capable of being used with precision being retained. The scientific study of the factors required in the diet for the maintenance in health of all the functions of the body has only just begun, and it may be that the discovery of the necessary constituents of an adequate and healthy diet will remove the necessity for using drugs and chemicals to maintain the apparatus of digestion and elimination in normal working order. Similarly, further knowledge of the endocrine glands and their active constituents will remove the necessity for using merely palliative drugs in the treatment of diseases due to disorders of these organs.

The discovery and elimination of the vectors of certain diseases and the discovery of substances which destroy such organisms as spirochaetes and trypanosomes will produce the greatest changes in the future. Until preventive medicine has advanced much further, however, the symptomatic treatment of disease will remain, but this will progressively lose its former undue and unscientific predominance.—J. A. NICHOLSON.

QUABECK, H. (1932). Die Einwirkung des Neosalvarsans auf das Blutbild und die Senkungsgeschwindigkeit beim gesunden Pferde. **[The Influence of " Neosalvarsan " on the Blood Picture and Rate of Sedimentation of Corpuscles in the Horse].**—*Inaug. Diss. Berlin.* pp. 27. 10 tables. [43 refs.]

Working on ten normal horses, the author found that intravenous injection of the usual dosage of " salvarsan " (4·5 g.) had no effect on the form, number or rate of sedimentation of erythrocytes (citrated blood), but did influence the leucocyte count to a small extent for a short time. Within the first hour, the count fell slightly, rose again in the ensuing two hours and returned to normal over the following 24 hours. One and a half hours after the injections the neutrophiles

showed an increase which became pronounced in three hours. The lymphocytes showed a corresponding decrease but the original relationship was restored within 24 to 30 hours.—H. H. Green.

Weed, L. A., & Ecker, E. E. (1932). **Bactericidal Action of Phenyl-Mercury-Nitrate. Further Observations.**—*J. Infect. Dis.* **51.** 309-314. 6 tables. [4 refs.]

This is a continuation of a previous paper by the same author [(1931). *J. Infect. Dis.* **49.** 440]. In the first paper it was shown that phenyl-mercury-nitrate in very high dilution exerts a strong disinfecting and antiseptic action on bacteria and moulds. It does not stain and is odourless, tasteless, colourless and non-corrosive. Large doses may be given orally, intravenously or intraperitoneally without serious results.

In the present article the compound was tested against a number of different organisms using a modified Reddish technique. 0·5 c.c. of suspension of *Bact. coli* was killed in 5 minutes by a dilution of 1 : 50,000, *Staphylococcus aureus* by a dilution of 1 : 62,000 and sporulating *Clostridium septique* in 10 minutes by a dilution of 1 : 37,000. Renal tissue did not interfere with the bactericidal action, but liver tissue had a marked effect.

Phenyl-mercury-chloride is much less soluble than the nitrate, but is a more powerful disinfectant.

The bactericidal action is not selective with regard to the species of bacteria acted upon.—George Slavin.

Panisset, M. L., & Masson, G. (1933). Quelques essais avec un composé de l'acridine, la gonacrine (chlorométhylate de diamino-acridine). [**Some Trials with an Acridine Compound—Gonacrine (Chlormethylate of Diamino-Acridine**)].—*Bull. Acad. vét. France.* **6.** 67-71. [1 ref.]

Details are given of the composition and description of gonacrine. Experiments on dogs were undertaken to ascertain whether the drug became fixed by the nerve centres and it was found that this did not occur when the drug was administered intravenously in doses increasing from 0·00125 to 0·00375 g. per kg. body weight. In one experiment, however, the simultaneous intravenous injection of hexamethylenetetramine (10 cg. per kg.) and gonacrine (12 mg. per kg.) was followed by the presence of gonacrine in the nerve centres in a very small quantity.

Cattle tolerated doses *per os* up to 18 mg. per kg., though the dose for intravenous injection should not exceed 4 mg. Elimination is by the urine. Only after the ingestion of almost toxic doses was a minute quantity of the drug eliminated in the milk.

Horses tolerate from 20 to 25 mg. per kg. body weight by the mouth and elimination occurs very rapidly by the urine. No trace of the drug was found in the faeces and, on account of its total absorption and rapid elimination, it is considered that the drug will probably be without action on intestinal parasites.—J. S. Steward.

Hucker, G. J., & Lee, Dorothy A. (1932). **Mastitis. II. The Use of Certain Dyes in the Treatment of Mastitis.**—*New York Agric. Expt. Sta. Bull.* No. 205. pp. 35. 17 tables. [4 refs.]

The authors have studied the value of crystal violet, brilliant green, acriflavine and azamine (a pyridine derivative) in the treatment of clinical and of latent mastitis. Treatment was carried out by the oral and intravenous routes and by intramammary injection *via* the teat canal. Before commencing to use the latter method, an attempt

was made to find some vehicle which would not irritate the mammary tissues. A comparison was made of the results of injecting by gravity 250 c.c. of various solutions, viz., solutions of sodium chloride from 0·05 to 0·2 per cent., a solution containing 0·12 per cent. of sodium chloride and 3·5 per cent. of lactose, Ringer's solution and synthetic milk. Samples examined 15 hours later showed that the reactions to the last two vehicles were very severe. The sodium chloride solution which caused the minimum of reaction was 0·12 per cent., and the reaction to this was further decreased by the addition of 3·5 per cent. of lactose. A solution containing 0·12 per cent. of sodium chloride and 3·5 per cent. of lactose was therefore used in all the dye experiments.

Brilliant green (1 per cent.) and crystal violet (1 per cent.) both caused violent reactions. Acraflavine in 0·5 per cent. concentration caused a definite, but less severe reaction and is also not considered a suitable agent for udder injection. The oral administration of 2,000 c.c. of a saturated solution of crystal violet in 90 per cent. alcohol or of 100 g. of acriflavine daily for two weeks had no demonstrable toxic effect, but only small amounts of either dye were excreted in the milk and no appreciable effect on the streptococci, cell count or pH was noted.

Azamine similarly had little effect when given orally or intravenously. Udder injection made with a 0·5 per cent. solution in two cows caused little or no irritation and was followed by a marked decrease in the number of streptococci in one cow and complete disappearance in the other. From further tests on 92 cows in the field it is concluded that 68 benefited by the treatment whilst 21 were not improved and 3 were aggravated.—A. W. Stableforth.

I. Emeric, P. (1932). L'agalaxie contagieuse du mouton et de la chèvre : son traitement par le Stovarsol Sodique. **[The Treatment of Agalactia of the Sheep and Goat with Stovarsol]**.—*Thesis for Docteur vétérinaire, Toulouse.* pp. 76. [74 refs.]

II. Veloppé. (1932). Un essai de sérothérapie de l'agalaxie contagieuse. **[The Serum Therapy of Agalactia]**.—*Rev. gén. Méd. vét.* **41**. 65-76. [14 refs.]

I. After reviewing the main features of agalactia, the author describes the effect of stovarsol on the course of the disease. In a series of 95 goats treated by various routes there were three deaths, the remainder making a good recovery. It is noted, however, that the drug was incapable of influencing a mammary localization of the virus, the animals remaining carriers in spite of treatment. The method which is recommended is the injection of a 1 : 8 solution of the sodium salt in three doses of 10 c.c. each at intervals of 24 hours.

II. An account of an outbreak of agalactia in which an attempt was made to control the course of the disease with hyperimmune serum. Unfortunately, the serum was only available in limited amounts ; it was also applied several months after the commencement of the outbreak. Nevertheless, the author considers that the results were encouraging since the serumized sheep, although selected from the most severe cases, were not subsequently affected with the complications which were noted in the controls. It is suggested that if the serum had been given at an earlier stage the results would have been more spectacular.—R. E. Glover.

Gluschke, A. (1932). Die synthetische Darstellung neuer Wurmmittel und deren pharmakologische Auswertung. Ein Beitrag zur Kenntnis der Beziehungen zwischen chemischer Konstitution und vermifuger Wirkung in der Santoningruppe. II. Mitteilung. Pharmakologischer Teil. **[The Synthetical Preparation of a New Anthelmintic and its Pharmacological Valuation. A Contribution on the Correlation between Chemical Constitution**

and Anthelmintic Action in the Santonin Group].—*Arch. wiss. prakt. Tierhlk.* **65.** 201-243. 15 figs., 3 tables. [66 refs.]

This work was originally undertaken to ascertain the anthelmintic action and general pharmacological action of the various chemical groups within the santonin molecule, and also to find out whether similar substances of equivalent anthelmintic efficiency could not be more cheaply prepared synthetically. 5-tetralol-6-acetic acid lactone, known as " syntonin-a," and 5-tetralol-6-propionic lactone, known as " syntonin-b," were found to be the most active.

Tests carried out *in vitro* (principally on the muscle of earthworms) showed these substances to compare very favourably with santonin and they were therefore tried on the living animal. These tests *in vivo* showed both substances to be remarkably safe for dogs, doses as high as 10 to 18 g. only resulting in disturbance of appetite and in one instance, in nephritis. Human beings, however, proved to be much less tolerant, and toxic symptoms appeared after a dose of 3 g.

Therapeutic tests on dogs carrying ascaris showed both " syntonin-a " and " syntonin-b " to have an anthelmintic action similar to that of santonin. A single dose removed only 15 to 40 per cent. of the worms and repeated doses were necessary to obtain the maximum anthelmintic effect.—E. L. Taylor.

I. Lagaillarde. (1932). Traitement des helminthiases du cheval. [**Treatment for the Helminthiases of the Horse**].—*Rev. vét. et J. Méd. vét.* **84.** 502-504.

II. Middeldorf, R. (1932). Wirkung, Verträglichkeit und Dosierung der Panserapiskapsel als Wurmittel bei Pferden. [**Panserapis Capsules as an Anthelmintic for the Horse**].—*Tierärztl. Rdsch.* **38.** 802-803.

I. As a result of accidents in the administration of the author's anthelmintic mixture to horses in the form of a draught, he has made use of the electuary and now recommends this method of administration as both safer and easier. Two electuaries are given, a first one of 20 g. of chloroform in molasses and liquorice powder followed immediately by a second of 100 g. of turpentine, 20 g. of aloes made up with molasses and liquorice powder, a balling gun being used to place them at the back of the mouth. A 48-hour fast is recommended before the drugs are given and an injection of arecoline immediately afterwards. In the author's hands and in the hands of other veterinarians, the treatment has been found safe, easy to carry out and effective.

II. This proprietary preparation is said to contain hexachlorethane as its principal ingredient. The author of the note, who is a veterinary practitioner, has used it in 39 cases of worm infestation in the horse and found it to be very effective for the removal of strongyles, ascaris and gastrophilus and to be safe enough for general use, even for foals.—E. L. Taylor.

I. Robert, R. (1932). L'helminthiase intestinale de la poule et du pigeon. Son traitement par le bromhydrate d'arécaïdine. [**Intestinal Helminthiases of the Fowl and the Pigeon. Its Treatment with Arecoline Hydrobromide**]. *Thesis for Docteur vétérinaire, Alfort.* pp. 61. [22 refs.]

II. Kessler, E. (1932). Bilharziose du canard par Bilharziella polonica. [**Bilharziasis of the Duck caused by** *Bilharziella polonica*].—*Thesis for Docteur vétérinaire, Alfort.* pp. 46. 4 figs. [38 refs.]

I. An account is given of the most common intestinal parasites, their classification, evolution, epidemiology, symptomatology, diagnosis, pathology, prophylaxis and treatment. Special mention is made of treatment with arecoline hydrobromide, the author having found this drug to be perfectly safe and to give very encouraging

results for the removal of both nematodes and cestodes. [Arecoline hydrobromide is usually supposed only to have an action upon cestodes. It has been reported by some other observers to be dangerously toxic for fowls].

II. In this thesis is collected some general information on the history and classification of schistosomes, and special information on *Bilharziella polonica*, its distribution, biology, diagnosis, the pathological lesions produced by infestation of ducks, and attempted treatment.—E. L. Taylor.

Stafseth, H. J., & Thompson, W. W. (1932). **The Effects, Treatment and Prevention of Worm Infestation in Poultry.**—*J. Amer. Vet. Med. Ass.* **80.** 467-474. [1 ref.]

This paper gives an account of the effect of a colloidal preparation of iodine called " iodine vermicide " in the removal of roundworms and tapeworms from poultry. Particulars are given of the number of worms expelled by the treatment and the number found on *post-mortem* examination to have been unaffected, suggesting that the remedy is almost 100 per cent. efficient. Extensive field trials have also been carried out and the remedy was found to be perfectly safe and to produce good results. Particulars of the preparation of " iodine vermicide " are not given.—E. L. Taylor.

I. Russell, P. F., & Nono, A. M. (1932). **Avian Malaria Studies. VII. Plasmochin as a Prophylactic Drug in Sporozoite Infections of Avian Malaria.**—*Philippine J. Sci.* **49.** 595-626. 2 figs. on 1 plate, 13 tables. [20 refs.]

II. Russell, P. F. (1932). **Avian Malaria Studies. VIII. The Bleeding Time in Canaries; Normal and in Malaria.**—*Ibid.* 627-650. 5 plates, 19 tables, 1 chart. [12 refs.]

I. At the start of the experiments on the prophylactic effect of plasmochin on sporozoites, *Plasmodium cathemerium* transmitted by *Culex quinquefasciatus* was utilized, but an infection rate of only 2·6 per cent. was obtained and a change was made to *P. capistrani* with which an infection rate of 36·7 per cent. was given. The results indicate that plasmochin, in doses which are not toxic, does not protect against malarial infection when sporozoites are injected by the needle or by mosquitoes. Plasmochin simplex in actual contact with sporozoites, of either *P. cathemerium* or *P. capistrani*, for 15 minutes in a glass beaker, did not destroy or inactivate the parasites.

II. The bleeding time is estimated in human beings by making a small cut with a Hagedorn needle and blotting up all blood which flows out every half minute. The size of the blots of blood shows the decrease in the rate of bleeding and the duration of the haemorrhage is known as the bleeding time. As the rate of blood dripping in birds is much faster than in human beings, the procedure was modified and blood flowing out of the cut was absorbed on blotting paper every ten seconds. The average bleeding time in normal canaries was 42·4 ± 10 seconds, but with malarial canaries it was extended to as long as 118·6 seconds. The greatest average bleeding time occurred on the eighth day after inoculation and it returned to normal about the 21st day. This prolonged bleeding time coincides with, but is not necessarily caused by, a decrease in the number of red blood cells and, apparently, a decrease in the calcium content of the blood.—U. F. Richardson.

I. Pécard. (1932). Contribution au traitement des Strongyloses gastro-intestinales des petits Ruminants par le tétrachlorure de carbone et le tétrachloréthylene. [**The Treatment of Parasitic Gastritis in Sheep and**

Goats with Carbon Tetrachloride and Tetrachlorethylene].—*Bull. Soc. vét. prat. Paris.* **16.** 76-82.

II. Darrou. (1932). Contribution au traitement des strongyloses gastro-intestinales des petitis ruminants par le Tétrachlorure de carbone et le Tétrachloréthylene. [**The Treatment of Parasitic Gastritis in Sheep and Goats with Carbon Tetrachloride and Tetrachlorethylene**].—*Ibid.* 105-107.

I. It was the author's intention to try carbon tetrachloride on a large scale for the control of fascioliasis, but he found that the several flocks of sheep and goats supposedly suffering from liver rot were actually suffering from parasitic gastritis : he proceeded to treat them, however, with carbon tetrachloride and tetrachlorethylene, 1 and 2 c.c. respectively, and obtained excellent results. Details are given of the observations made on five flocks.

II. A contribution to the discussion on Pécard's paper is here published in which Darrou emphasizes the safety of the treatment, the advantage of using capsules and the adequacy of the dose recommended by Pécard.

—E. L. Taylor.

Goffinet, L. (1933). Sur les applications thérapeutiques des sels de calcium. [**On the Therapeutic Application of Calcium Salts**].—*Ann. Méd. vét.* **78.** 8-23. [11 refs.]

Describes the *ante-partum* paraplegia and mentions experiences of other authors. The opinions of Detrez regarding the role played by guanidine are discussed. According to Detrez, *ante-partum* paraplegia is a toxaemia of placental origin ; his treatment is described in detail. The author differentiates between this disease, which he says occurs in two forms, benign and serious, and various other diseases of gestation. A similarity between this disease and acetonaemia was noted and on analysis of the blood the mineral content was found to be altered, calcium salts being less in quantity. The phosphorus content varied somewhat and the quantity of magnesium salts was less than normal. Treatment is described by the author [see this *Bull.* **4.** 49].

Preventive treatment is advised by giving either meadow hay or lucerne before putting the cattle to grass. Curative treatment consists in giving calcium salts ; salts of magnesium are also advised. The author thinks that transit fever is also due to a disturbance of metabolism, the blood being found to contain less salts of calcium and an increased quantity of guanidine. Treatment consists of the administration of calcium salts.—R. G. Linton.

POISONS AND POISONING.

Steyn, D. G. (1932). **Investigations into the Toxicity of Known and Unknown Poisonous Plants in the Union of South Africa.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 871-891. 1 table. [12 refs.]

The author has tested biologically 27 species known or reputed to be poisonous. Of these 17 gave negative results under the conditions of the tests. The poisonous effects of *Equisetum ramosissimum* (dronkgras) reputed to cause " drunkenness " or " shivering " are confirmed. The toxic principle was not isolated, but an absolute alcohol extract caused fatal convulsions, which were precipitated by excitement or movement, in a guinea pig.

Amongst the Solanaceae, *Nicotiana glauca* was found to cause typical nicotine poisoning in rabbits and sheep ; the ripe fruits of *Solanum incanum* and of *S. nigrum*

are harmless whereas the unripe berries proved toxic to rabbits, but both ripe and unripe fruit of *S. rigescens* are harmless.

Urginea altissima previously stated to contain the same active principle as *U. scilla* is now proved to be toxic to sheep.

Dipcadi glaucum, *Gnidia Burchelli* and *S. panduraeforme* are now for the first time shown to be poisonous.—G. D. Lander.

MacDonald, R. A. S., & le Roux, P. L. (1932). **Plant Poisoning in Cattle and Sheep in Northern Rhodesia.**—*Ann. Bull. Dept. Anim. Health, Northern Rhodesia.* pp. 29-37.

This paper gives practical advice to owners and inspectors as to the symptoms, treatment, *post-mortem* appearance, differential diagnosis and prevention of types of local plant poisoning, of which four types are signalized, viz. :—*Senecio retrorsus* [and spp.] marked by straining, with dark coloured offensive dejecta, and cirrhosis of the liver ; *Morea natalensis*, illustrating the well-known " tulp " poisoning ; *Urginea altissima*, which causes death so rapidly that few symptoms are observable ; and *Urginea Burkei*, which causes the familiar " slangkop " poisoning.

—G. D. Lander.

Kropf, R. (1933). Ueber Bingelkrautvergiftungen bei Rindern. [**Mercurialis Poisoning in Cattle**].—*Oesterr. Tierarzt.* **6.** 99-100.

Four cases of damage to cattle are recorded as the result of eating *Mercurialis annua* in the fodder. The important symptoms were blanching of the visible mucosa, accelerated and throbbing heart beat, and haemoglobinuria. Gastro-enteritis may ensue. The red-brown colouration of the urine was diagnosed as true haemoglobinuria, whereas the colouration observed in experimental tests on pigs and guinea pigs quoted by the author was due to indigo, which is a constituent of the plant. The disorder yielded to administration of coffee, purgatives and removal of the cause.

According to local agriculturists, cases of injury by this plant occasionally happen, especially in the autumn of a year of shortage of herbage.

—G. D. Lander.

PHYSIOLOGY.

I. Mangold, E. (1932). Die mechanischen und chemischen Verdauungsvorgänge bei den Wiederkäuern. [**Mechanical and Chemical Processes in Digestion of the Ruminant**].—*Med. Klin.* **28.** 1336-1338. [11 refs.]

II. Mangold, E. (1933). Die Infusorien des Pansens und ihre Bedeutung für die Ernährung der Wiederkäuer. [**Infusoria of the Rumen and their Significance for the Nutrition of Ruminants**].—*Biedermanns Zlb.* A. **3.** 161-187. 4 tables. [123 refs.]

I. A general paper discussing the physiology of rumination, including the innervation of the rumen, reticulum, omasum and abomasum, and the part played by secretions and by rumenal flora.

II. A review article with an extensive bibliography. The number of infusoria in the rumen is commonly about a million per c.c. but may reach several million. About 30 species of ciliates have been classified, with smaller numbers of species of flagellates and amoeba.

Particular species tend to dominate under particular conditions of nutrition and the same animal may show considerable variations from day to day. Some

species are widespread amongst cows and sheep, some animals (e.g. *Buffalus bubalus*) harbour most of the classified rumenal ciliates whilst others (camel and antelope) seem to harbour only few species. These differences are accounted for by the feeding habits of the animals and by the fact that infusoria are transmitted from one animal to another by salivary contamination of the food supply.

The numbers of infusoria drop rapidly in fasting and about five days starvation usually renders the rumen free from these organisms. Exclusion of hay or other cellulose-rich food from the diet has a similar effect and lambs on a milk diet show no infusoria. Counts on rumenal contents of goats showed the highest figures at the height of lactation—an observation related to age and nutrition.

Rumenal infusoria assist the digestion of roughage by breaking up cellular material and converting starch into glycogen. The proportion of food protein metabolized by the infusoria, but subsequently recovered by the animal by digestion of the infusorial cells, is considerable.

Although not necessary for the life of the host the rumenal infusoria are regarded as exercising a useful symbiotic function.—H. H. Green.

Newman, C. (1933). **Physiology of the Gall-Bladder and its Functional Abnormalities. I. Physiology. II. Disorders of Motility.**—*Lancet.* **224.** 785-791 and 841-848. 1 fig., 5 tables. [148 refs.] [The Goulstonian lectures, delivered before the Royal College of Physicians of London on March 7th, 9th and 14th, 1933].

I. It is accepted that the gall-bladder possesses the power of concentrating the bile ; it does this by means of the mucous membrane of the fundus and body, which are lined with columnar epithelium, thrown into minute folds and which contain no glands. Mucus-secreting glands are to be found, however, in the infundibulum, cystic duct and bile ducts. In animals which have no gall-bladder, the liver compensates by secreting a more concentrated bile.

The filling of the gall-bladder during fasting is accompanied by closure of the sphincter of Oddi. When the gall-bladder is full the sphincter relaxes and lets off liver bile into the duodenum. The physiological stimulus for the expulsion of bile from the gall-bladder is the passage of food into the duodenum.

The gall-bladder, sphincter and ampulla of Vater are supplied with nerves from the vagus and the splanchnic sympathetic. The sympathetic is inhibitory while the effect of the vagus depends upon the strength of stimulus, weak vagal stimulation being motor to the gall-bladder. The nervous mechanism is probably supplemented by a humoral mechanism, the substance involved being cholecystokinin which causes a constriction of the gall-bladder.

II. Disorders of motility may be classified into those cases in which the vagus is over-sensitive, leading to over-rapid emptying of the gall-bladder, or spasm of the ampulla and complete cessation of flow ; and those cases in which the vagus is under-sensitive, leading to the relaxation of the gall-bladder and ampulla and spasm of the sphincter of Oddi, again with the cessation of bile flow.
—J. A. Nicholson.

Klisiecki, A., Pickford, Mary, Rothschild, P., & Verney, E. B. (1933). **The Absorption and Excretion of Water by the Mammal. Part 1. The Relation between Absorption of Water and its Excretion by the Innervated and Denervated Kidney. Part 2. Factors influencing the Response of the Kidney to Water-Ingestion.**—*Proc. Roy. Soc. London. Ser. B.* **112.** 496-521 and 521-547. 3 figs. on 1 plate, 4 tables, 15 charts. [124 refs.]

I. The authors of this paper were able to determine that the average length

of the small intestine of dogs is 24·7 cm. per kg. body weight and that a dog weighing 10 kg. might be expected to absorb 250 c.c. of water, distributed evenly along its gut, in 36 minutes. After the absorption of water there is usually a delay of about ten minutes before the kidneys begin to respond and of about 50 minutes before the response is at its maximum. The work under review was undertaken to apportion the delay between the processes involved and to determine the relationship between the water-load of the body and the rate of excretion of water.

In a series of young bitches the rate of water excretion was determined by giving 250 c.c. of tap-water warmed to 30°C. per stomach tube and recording the volume of urine secreted by each kidney. It was found that the response was complete in 3 to 3½ hours and at its maximum in 1¼ hours.

The rate of absorption was determined by giving 250 c.c. of water and at varying intervals afterwards killing the animal and immediately ligating the stomach and intestines, clamping the portal vessels and measuring the water content of the lumen of the gut. It was found that the water-load of the tissues was at its maximum 15 minutes before the height of water diuresis.

II. The inhibition of water diuresis by exercise was found to be independent of the nerve supply to the kidneys, since section of the renal nerves had no effect. Post-pituitary extract inhibits water diuresis after section of one or both nerves and this inhibition is probably due to a direct action of the pituitary extract on the renal parenchyma. Thyroxine was found to increase the intensity, but diminish the duration of the induced diuresis, again probably from a direct action on the kidney. It was shown that there exists at times a reciprocal mechanism between the salivary and urinary secretion of water.—J. A. NICHOLSON.

KRUG, E. F., & ROHDENBURG, G. L. (1932). **Foreign Substances Injected into the Vitreous of the Rabbit. Pathway of Transportation from one Eye to its Fellow ; An Experimental Study.**—*Graefes Arch. Ophthalmol.* **8.** 72-91. 27 figs. [6 refs.] [Orig. in English.]

The authors carried out a series of experiments on rabbits designed to demonstrate the possible pathways between the eyes and to explain if possible the debated pathogenesis of sympathetic ophthalmia.

By injection of various substances into the vitreous humor they were able to trace the transportation from one eye to the other as follows :—from the vitreous to the retina, between the cells of the retina to the choroid, through the lymph clefts of the optic nerve—particularly about the central blood vessel and sheath—to the chiasma, and from this point onwards the pathway naturally is the reverse until the vitreous of the other eye is reached.—J. R. M. INNES.

I. MEERSON, I. S. (1932). Ueber eine noch unbekannte Funktion des Retikuloendothelialsystems. XV. Transplantierung der Milz als Methode zur Erforschung des Mechanismus jener Funktion des Retikuloendothelialsystems, welche den Vollwert der chemotherapeutischen Wirkung im Organismus bedingt. [**Concerning a still Unknown Function of the Reticulo-Endothelial System. XV. Transplanting the Spleen as a Method for Investigating the Mechanism of that Function of the Reticulo-Endothelial System, which establishes the Full Value of Chemico-Therapeutic Action in the Body**].—*Zschr. Immun-Forsch.* **73.** 326-337. 2 figs., 4 tables. [23 refs.]

II. ELVIDGE, A. R. (1933). **The Reticulo-Endothelial System and the Source of Opsonin.**—*J. Immunol.* **24.** 31-64. 4 figs. [15 refs.]

I. The removal of some reticulo-endothelial cells and their replacement in

other parts of the body was accomplished by transplanting the spleen, under aseptic conditions, into the back and hip muscles of a series of mice. The animals were then given various arsenic compounds *per os* and infected with spirochaetes. From these experiments it was established that the reticulo-endothelial cells exercise two functions, a defensive mechanism against infective agents and the power of storing medicinal compounds for a certain length of time in the body, but on transplantation to another part of the body they can no longer collect and store chemico-therapeutic compounds.

II. Following the intravenous injection of quartz particles into rabbits, there is a progressive lowering of the opsonic index. The quartz particles are ingested mainly by the cells of the reticulo-endothelial system in the liver, spleen and bone marrow. The lessened power of the polymorphonuclear leucocytes to phagocytose micro-organisms is thought to be due to the already ingested quartz particles disturbing the respiration or metabolic activity of the cells, i.e. the action of the particles is physical or physico-chemical and not chemical ; further, it is non-specific. This work also showed that opsonin deteriorates when kept for 24 hours at room temperature and that it is a definite chemical substance produced by the cells of the reticulo-endothelial system.—J. A. Nicholson.

Addis, M. (1933). Sulla struttura e sul significato delle caruncole amniotiche della vacca. [**On the Structure and Function of the Amniotic Villi of the Cow**].—*Nuova Vet.* **11.** No. 1. 12-15. 2 figs.

In this paper the author gives a detailed account of the macro- and microscopic appearance of the amniotic villi. These structures are to be seen on the lamina interna of the amnion as whitish or yellowish plaques, sometimes in the form of villi, but more often flattened. Their number decreases after the fourth month of pregnancy, until, at the seventh to eighth month, their typical structure has been lost and they have become completely stratified. Appropriate staining shows them to contain glycogen in large amounts during the early stages of pregnancy, but with the change in structure this substance gradually disappears. Earlier workers thought that these villi undertook the glycogenic function of the foetal liver until that organ was fully developed. The author of this paper, however, considers that this is incorrect and that the glycogen present is solely concerned with the vital activity of the villi cells.—J. A. Nicholson.

I. & II. Grosser, O. (1933). **Human and Comparative Placentation including the Early Stages of Human Development. I. General Principles of Placentation. II. The Early Stages of Development.**—*Lancet.* **224.** 999-1001 and 1053-1058. 12 figs. [A series of lectures in human anatomy delivered before the University of London on May 2nd, 5th and 6th, 1932].

III. —. (1933). **Physiology of the Placenta.**—*Ibid.* 1080-1081. [1 ref.]

I. Based on the structure of the uterine mucosa and chorion, four types of placentation may be recognized :—(1) the epithelio-chorial, where the uterine epithelium adjoins the chorion, as in the pig and the cow ; (2) the syndesmochorial, where the uterine epithelium is shed, the chorion being in contact with maternal connective tissue, as in the deer ; (3) the endothelial-chorial, where the epithelium of the chorion reaches the maternal vascular endothelium, as in the carnivora and (4) the haemo-chorial, where the maternal blood directly reaches the chorionic epithelium, as in rodents, monkeys and man.

Whilst simple chemical substances, e.g. respiratory gases, salts and sugars can pass by osmosis through the placenta, the colloids—especially the proteins—must be decomposed into their constituent parts. It is necessary, therefore, to

ascribe to the chorion a digestive and resolving power and to admit that the chorion is capable of secreting enzymes for that purpose.

II. Comparative embryology reveals that there are three main methods by which implantation of the ovum takes place :—(1) the central type, in which the ovum remains in the lumen of the uterus and enters into relation with the mucosa only after having reached a certain size ; (2) the eccentric type, in which the ovum passes into a crypt of the uterine mucosa and (3) the intradecidual type, in which the ovum by its own activity penetrates into the mucosa, probably by tryptic or fermentative activity of the tropoblast.

III. Accurate information of the biochemical functions of the placenta can be obtained only by taking blood directly from the vessels which supply the uterus, and from the arteries and vein in the umbilical cord.

Most substances with small molecules, about the size of those of cane sugar, seem to pass freely through the placenta, as do certain hormones and some immune bodies, but not antigens. The placenta acts as a storehouse for the sex hormones and possibly produces a hormone of its own. Research has tended to show that more highly developed types of placenta perform their main function by simpler means than do primitive types.—J. A. Nicholson.

Schatalow, P. (1933). Zur Frage des Geschlechtszyklus der Pferde und Kühe nach dem mikroskopischen Bilde des Vaginalausstriches. [**The State of the Sexual Cycle in Horses and Cows as determined by the Microscopic Appearance of the Vaginal Discharge**].—*Berl. tierärztl. Wschr.* **49.** 81-84. 2 figs., 1 table, 1 graph. [11 refs.]

The microscopic appearance of the oestral period in agricultural animals has, up to the present time, received scanty attention and this communication considers the character of the vaginal discharge during the four periods into which the complete sexual cycle is usually divided.

The experimental work deals with 60 sexual cycles from 34 normal cows. The discharge was collected by means of a sterilized spoon introduced halfway or further up the vagina and scraped against the side or upper mucous membrane. A drop of the contents was then placed on a slide and thin smears made. These were stained by Zondek's method.

The stages of the sexual cycle are recognized by the amount and quality of the mucous secreted by the vaginal wall, the number of leucocytes present and the condition of the epithelial cells.

In dioestrus there is a gradual disappearance of the leucocytes, an increase in mucous secretion and epithelial cells are normal.

Pro-oestrus shows a further disappearance of the leucocytes, mucous secretion is increased and the nucleated epithelial cells disappear.

Oestrus shows the complete disappearance of the leucocytes, a large secretion of thin clear coloured mucus and non-nucleated cornified epithelial flakes.

Metaoestrus. On the third day after oestrus an enormous number of leucocytes as well as normal small vaginal epithelial cells are seen in the discharge. The mucous secretion is scanty.

During pregnancy the periodicity of the sexual cycle ends and the vaginal discharge always shows the same form—normal small epithelial cells, many leucocytes and little mucus. The discharge in the later stages of pregnancy shows normal epithelial cells with nuclei and the almost complete absence of leucocytes. These conditions remain until the third to fifth day after parturition when an enormous number of leucocytes appear. These remain in the discharge until the pro-oestral stage.

The stage of the sexual cycle was checked by slaughtering the animals and examining the ovaries histologically. It is considered that these results furnish a practical method of determining the stage of the sexual cycle. From earlier experiments vaginal smears from mares appear to be very similar to those from cows.—J. A. Nicholson.

Florey, H. (1932). **Mucous Changes in the Epithelial Cells of the Rat's Vagina during the Early Stages of Pregnancy.**—*Brit. J. Exp. Path.* **13.** 323-327. 8 figs. [5 refs.]

A description of the changes which occur in the rat's vagina in early pregnancy, during which the normal stratified squamous epithelium-producing keratin is transformed into cells producing mucin. It was hoped that additional data would be forthcoming for the understanding of the pathological mucous changes [mucous degeneration], but it was concluded that the mucification was not accomplished by wholesale alteration of protoplasm into mucus—" a degeneration." The droplets were manufactured in the base of the cell. The process is an example of physiological metaplasia taking place under the influence of a hormone (corpus luteum ?). Mitochondrial changes do not bear any obvious relationship to these cellular activities.—J. R. M. Innes.

Girard, A., Sandulesco, G., Fridenson, A., & Rutgers, J. J. (1932). Sur une nouvelle hormone sexuelle cristallisée. [**A New Crystalline Sexual Hormone**]. —*C. R. Acad. Sci. Paris.* **195.** 981-983. [3 refs.]

A new oestrogenic oxyketone has been isolated from mares' urine. This hormone, " équilénine," is more acid than the other hormones present in urine and has been separated from them by methods of alternate fractional extractions with dilute alkalies and crystallizations from alcohol. Its melting point is 258° to 259°C. and it forms rounded bushes of fine needles when immersed instantaneously in a bath at this temperature ; otherwise it decomposes at 245°C. It dissolves in alkalies giving a greenish blue solution. It rotates polarized light : $(\alpha)_D^{16} = + 87°$.

Other physical and chemical properties are described and the empirical formula $C_{18}H_{18}O_2$ is suggested. It is considered to be closely related to folliculin $[C_{18}H_{22}O_2]$, but has a much less powerful oestrogenic activity.

—W. R. Wooldridge.

Pittermann, J., & Schouppé, K. (1932). Hat die orale Verabreichung von Ovarien ohne Corpora lutea bei Hähnen und Ebern Veränderungen an den Keimdrüsen zur Folge ? [**Is the Oral Administration of Ovaries without Corpora lutea to Cocks and Boars followed by Changes in the Reproductive Glands ?**]—*Arch. wiss. prakt. Tierhlk.* **64.** 484-502. 2 figs., 1 table. [23 refs.]

Previous workers have established that the feeding of ovaries can produce changes in the male body and the authors of this paper have attempted to elucidate the exact nature of these changes. The experiments were carried out with two boars and a series of cocks.

Daily doses of about 8 g. per kg. body weight of horse ovary (totalling in one case 39,600 g., and in the other 57,610 g. of ovary) were unable to produce either macroscopic or microscopic changes in the testicles of the two boars. Moreover, at the end of the feeding period, both were able to serve sows. In one case a sow killed 12 days after service showed 6 embryos *in utero* ; the other was barren but, as the experimental boar which had been used in this case was a cryptorchid, the result was probably due to a natural impotency.

Daily doses of 9 to 13 g. per kg. body weight of cow and horse ovary fed for 200 days or more to cocks produced distinct macroscopic and microscopic changes, both in adult and immature animals. In one case a lipoid-free ovarian extract was injected subcutaneously and this also produced similar changes.

An alteration in the secondary sexual characters took place, the chief features being a decrease in size of the comb and wattles, and voice changes. The macroscopic appearance of the testicles was normal, but on histological examination an enlargement of the seminiferous tubules, a diminution of the seminal epithelium and a clumping of the spermatozoa were to be seen. On running these cocks with hens, 40·7 per cent. of the eggs were infertile and of those which were fertile all the embryos died at an early stage of development. It appears, therefore, that a marked injury to the fertilizing power of the spermatozoa had been caused. —J. A. Nicholson.

Luy, P., & Schmitt, J. (1933). Der Gehalt des Blutserums an Calcium und anorganischem Phosphor im Hungerzustande, nach intravenöser Einverleibung von Calcium- und Phosphathaltigen Lösungen und nach Aderlässen. [**The Calcium and Inorganic Phosphorus Content of Bloodserum in Fasting Animals after Intravenous Injection of Solutions containing Calcium and Phosphorus and after Bleeding**].—*Deuts. tierärztl. Wschr.* **41.** 162-166. 5 tables. [30 refs.]

The authors review recent literature and then describe their own investigations. The following results were obtained :—

During a fast the phosphorus content of serum often shows a large increase. In consequence, the calcium content is inclined to fall, but this does not always occur.

Intravenous injections of medicaments containing calcium or phosphorus into sheep and goats generally lower the serum content of the other element.

Intravenous injections of inorganic and organic calcium chloride raise the calcium content in different degree, the hypercalcaemia made by inorganic calcium sinking more rapidly.

The bleeding of sheep without causing danger of death and bleeding to death of suckling pigs have no influence on the calcium content nor on the inorganic phosphorus content of serum.

In healthy pigs from three to six weeks old the calcium content of serum is found to be 10·77 mg. per cent. and the inorganic phosphorus content to be 8·01 mg. per cent.—F. W. Müller (Berlin).

Poty, P. L. (1932). Contribution à l'étude des phosphates bicalcique et tricalcique dans l'alimentation des animaux domestiques. [**Contribution to the Investigation of Calcium Phosphates in the Feeding of Domestic Animals**]. —*Thesis for Docteur vétérinaire, Alfort.* pp. 63. 1 table. [45 refs.]

Consists of a survey of the calcium and phosphorus requirements of domestic animals with special reference to the Ca/P ratio which the author thinks should be unity. Records are given of original observations with breeding sows and rabbits. The utility of mineral calcium and phosphate is stressed and recommendations are made as to the manner in which these may be supplied.—R. G. Linton.

du Toit, P. J., Malan, A. I., & Groenewald, J. W. (1932). **Studies in Mineral Metabolism. XVIII. Phosphorus in the Nutrition of Sheep (Final Report).** —*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 611-630. 9 figs., 4 tables. [3 refs.]

This paper completes the study recorded in the previous report and carries on the series of papers from Onderstepoort on the significance of phosphorus in the nutrition of ruminants [see this *Bull.* **2.** 168]. The experiments were designed in direct relation to natural grazing conditions in South Africa and are therefore of obvious economic importance. The outstanding results may be indicated as follows :—

(a) Sheep receiving a daily intake of phosphorus equivalent to that naturally ingested by sheep grazing on typical Bechuanaland pastures suffered severe setbacks, made no gains over 24 months and ended up with reduced average weight.

(b) A group on the same ration supplemented with sodium phosphate in amount sufficient to bring the daily phosphorus intake up to the level of good English pastures made good gains, and were in excellent condition at the end of the experiment.

(c) A group receiving phosphorus in large excess of this grew well on the whole but ended up with an average weight below the optimum.

(d) Reproduction was apparently unaffected by the phosphorus content of the rations in these experiments [compare Bekker, & Rossouw, this *Bull.* **2.** 177].

(e) Phosphorus deficiency in the ration was reflected by reduced inorganic phosphorus in the blood.—H. H. Green.

Duerden, J. E., Bosman, V., & Botha, P. S. (1932). **Studies in Mineral Metabolism, XIX. Influence of Phosphorus and other Minerals on Wool Growth.** —*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 631-649. 12 tables. [6 refs.]

This paper deals with the wool of sheep reported upon in No. XVIII of this series [see above]. Examination showed that the fleeces of the phosphorus-sufficient group were 32 per cent. heavier than those of the deficient group ; staple length was 16·6 per cent. longer and fibre thickness 13·5 per cent. more. The wool growth was reduced by 12·5 per cent. in thickness during lactation as compared with gestation, the reduction in the phosphorus-sufficient group being about 14 per cent. less than in the deficient group.

These experiments serve to establish the fact that sheep on a diet deficient in phosphorus produce a lighter fleece, shorter in length and finer in quality [compare Bekker on Bredasdorp sheep, this *Bull.* **2.** 168]. As sheep increase in body-weight the weight of fleece also increases and the wool becomes longer and stronger ; as they decrease in weight the fleece becomes lighter, shorter and finer.—H. H. Green.

Dabrowska, W. (1932). Sur la composition chimique de la sécrétion lactée du jabot du Pigeon par rapport au taux d'accroissement des pigeonneaux. **[The Chemical Composition of the Milk Secretion of the Crop of the Pigeon in Relation to the Rate of Growth of the Young Birds].**—*C. R. Soc. Biol. Paris.* **110.** 1091-1093. 1 table. [10 refs.]

The crop milk of the adult bird was obtained by removing it from the full crops of one- to two-day-old pigeons. An analysis shows that it has high protein and fat contents, but is devoid of sugar. An average analysis gives the following figures (per cent.) :—water 76·75, proteins 13·34, fat 7·95, ash 1·52, carbohydrates nil. The high value for fats and proteins is probably related to the rapid growth of the young pigeon, which doubles its weight in 48 hours. Compare the composition of the milk of the rabbit, whose weight is doubled in 6 days : —water 69·5 per cent., protein 15·54, fat 10·45, ash 2·56 and carbohydrates 1·95.—W. R. Wooldridge.

TECHNIQUE.

I. Jusatz, H. J. (1932). Zur Technik des Fortnerschen Anaerobenzüchtungsverfahrens. [**The Technique of the Direct Method of Anaerobic Cultivation**]. —*Zlb. Bakt. I.* (*Orig.*). **127.** 212-213. 1 fig. [1 ref.]

II. Schmidt, E. (1933). Beitrag zur Anaerobenzüchtung. [**A Contribution to Anaerobic Cultivation**].—*Ibid.* 378-382. 7 figs. on 1 plate. [14 refs.]

I. The ordinary method of growing anaerobes on petri dishes requires much time and trouble and the growth of the oxygen-consuming organisms takes up much of the surface of the media. In this paper a modification of the usual technique is described which is designed to overcome these disadvantages. It consists essentially in sealing the edges of two petri dishes by means of a rubber or metal ring—8 mm. thick and 15 mm. wide. In this ring is a cellulose ring which takes up the water of condensation. These rings are attached to the petri dishes with plasticine and the whole is made air-tight by means of four clamps. One plate is inoculated with the oxygen-consuming organisms and the other with the required anaerobe.

II. In this communication an account is given of the use of Zeissler's blood plates for anaerobic cultivation. A detailed description is given of the preparation of the plates. Batches of 12 plates are prepared, sealed with two rubber rings and placed in a vessel which has been dried by means of calcium chloride. They are then placed in a desiccator and further dried over calcium chloride. The vessel containing the plates is evacuated by means of a water pump—a high vacuum not being necessary—and an oxygen-free atmosphere is maintained by growing *Chromobact. prodigiosum* in symbiosis with the anaerobe under cultivation.

From a study of certain anaerobic organisms it was seen that the colonies of the gas gangrene bacilli more frequently show a vine-leaf appearance than do other anaerobic bacilli.—A. J. Wilsdon.

I. Christiansen, C. (1932). Untersuchungen über die Trächtigkeitsfeststellung bei Stuten durch Hormonnachweis im Harn. [**Experiments on the Diagnosis of Pregnancy in Mares by the Demonstration of Hormone in Urine**].—*Inaug. Diss. Berlin.* pp. 35. 3 tables. [73 refs.]

II. Schätzl, J. (1933). Beitrag zur hormonalen Trachtigkeits-diagnose bei Stuten. [**Contribution to the Hormonal Diagnosis of Pregnancy in Mares**]. —*Münch. tierärztl. Wschr.* **84.** 29-30. [5 refs.]

I. Christiansen was able to confirm the results of Küst [see this *Bull.* **3.** 384.] by his work with 64 mares. Using pure urine for injection into infantile mice, the mortality of the latter was 18·5 per cent. and with ether-treated urine, 13·7 per cent. The results of the test were similar with pure or with treated urine. Two mares in oestrum gave a weak positive result.

The principle and technique of this method of early diagnosis of pregnancy is described fully. In mares the ovarian hormone induces the reaction in mice.

II. Schätzl performed tests with 63 samples of urine from mares and obtained reliable results in 96 per cent. of cases: two positive results were obtained from mares in oestrum. The author also reduced the mortality of his mice by preliminary treatment of the urine with ether. The method is reliable often from the 32nd day of pregnancy and certain from the 55th up to the 248th day [when clinical diagnosis is easy]. In three of the author's positive cases the hypophyseal hormones A and B could be demonstrated in addition to the ovarian hormone.—J. E.

Harrington, E. L. (1933). **The " Rotette " or an Apparatus for Handling Small Quantities of Liquids with Rapidity and Precision.**—*Science*. **77.** 21-23. 2 figs. [1 ref.]

This is a description of apparatus which can be used in place of the burette and pipette for rapidly measuring fixed quantities of liquids in chemical, biological and clinical laboratories. It has certain marked advantages such as the elimination of the rubber bulb, " sucking " with the mouth, the use of stop-cocks, etc., whilst much greater precision is claimed for it over the burette in titration work.

—Gwilym O. Davies.

MISCELLANEOUS.

—. (1933). **The Animal Health Research Station at Oonoomba, Townsville, Queensland, Australia.**

In the *Townsville Daily Bulletin* of June 8th, 1933, there appeared an illustrated article on the research station, the activities of which have recently been extended by a new financial arrangement by which contributions are offered by Queensland cattle owners (voluntary levy of one shilling per 100 head of stock), the Queensland Department of Agriculture and the Council of Agriculture in Queensland. The Empire Marketing Board was also scheduled to help considerably.

The veterinary staff consists of Dr. A. W. Turner (Director), Mr. A. D. Campbell (Assistant Bacteriologist), Dr. J. Legg (Protozoologist) and Mr. R. B. Kelly (Field Officer).

The animal diseases being investigated include tick-borne diseases, contagious bovine pleuro-pneumonia, bovine tuberculosis, " peg leg disease " of cattle, " walk-about disease " and other plant poisonings, blackleg and onchocerciasis.

The lay-out of the station, including the laboratory, is described and illustrated by six photographs.—J. E.

Heizmann, E. (1932). Zum 300. Geburtstag Anthony van Leeuwenhoeks des Erfinders des Mikroscopes. [**The Tercentenary of Anthony van Leeuwenhoek, the Inventor of the Microscope**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 1-9. 3 figs.

This is a brief biographical summary of the life and work of Leeuwenhoek, who was born at Delft on the 24th October, 1632. His scanty education, his marriage, his skill as a glass-blower and lens-grinder, and subsequently as silversmith, are touched upon, and an account is given of his growing expertness with the microscope up to the time de Graaf brought his observations to the notice of the Royal Society of London. His industry was astounding ; from the examination of animalculae in a drop of water, in saliva, bowel-contents, etc., he made ever new discoveries, though he did not know that certain of the bacteria he found were pathogenic. He went on to the microscopic structure of plants and animals, including the structure of the eye of insects. Perhaps his most important discovery was that in 1673 of the red corpuscles of the blood and of the capillary interchange from artery to vein. In 1680, to his great joy, he was made a Member of the Royal Society and it was to that body he sent in 1723, the year of his death, the last of many important communications. Heizmann shows, by reference to the labours of his successors, how deep is the debt which bacteriological science owes to Leeuwenhoek. The illustrations show a portrait of Leeuwenhoek, his apparatus for investigating the circulation of the blood, and his first microscope. [Readers

are referred to Dobell (1932). "Antony van Leeuwenhoek and his Little Animals." London : John Bale, Sons & Danielsson].—F. Bullock.

Buxton, P. A. (1933). **The Effect of Climatic Conditions upon Populations of Insects.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **26.** 325-354. 5 figs., 5 tables. [63 refs.]

In this paper the author presents a study of the effect of temperature and humidity on insect life in the laboratory. He is of the opinion that the laboratory method will eventually carry us further than we can go in the field, because results are obtained which are precise and repeatable ; they afford an interpretation of observations made in the field. Only a partial abstraction is possible of the large amount of work presented and the paper should be consulted in the original by those who are interested.

Temperature.—In the main there is a definite upper lethal temperature and it is perhaps for this reason that certain insects periodically become rare in hot climates, e.g. if pupae of *Glossina morsitans* are buried an inch beneath the soil they are killed if the surface of the soil is exposed to the sun for half an hour. On the other hand, insects possess considerable resistance to cold ; their rate of development is, however, greatly influenced by variations in temperature and it is found that a more rapid development occurs when the temperature fluctuates than when a constant mean is attained.

Humidity.—A distinction is drawn between those insects living in moist conditions and which use water freely (water " spenders ") and those which live in arid circumstances and conserve water (water " savers "). In connection with the former the author remarks that, as control of the tsetse fly depends almost entirely upon altering the climatic conditions of its haunts, a little work in the laboratory might explain and systematize the observations made in the field ; it may be that control is effected by exposing the fly to conditions of greater evaporation. Large insects, having proportionately less surface than small ones, are better able to balance the receipt of heat by expending water which is evaporated. Small insects as a rule inhabit moist places. The author defines at some length " saturation deficiency " and states that loss of water from insects is determined in the first instance by saturation deficiency and not by any other measure of humidity.

The question of an insect's ability to transmit a micro-organism under adverse conditions of humidity is raised, and the transmission of *Plasmodium praecox* by *Culex fatigans* and the spread of *Filaria bancrofti* are taken as examples. Other climatic factors affecting insect populations are mentioned and these include solar radiation and barometric pressure. It is stressed that meteorological conditions as measured by the meteriologists are not suitable for the entomologist because the exact conditions of the local habitat of the insect are ignored.

—Edward F. Peck.

Basset, J., & Macheboeuf, M. A. (1932). Études sur les effets biologiques des ultrapressions : Résistance des bactéries, des diastases et des toxines aux pressions très élevées. [**The Resistance of Bacteria, Diastases and Toxins to extremely High Pressures**].—*C. R. Acad. Sci. Paris.* **195.** 1431-1433. [1 ref.]

Bacteria immersed in a liquid (physiological saline or broth) submitted to a pressure of 4,000 atmospheres will grow subsequently on inoculation into suitable media: A pressure of 6,000 atmospheres killed non-sporulating bacteria (*Chromobact. prodigiosum, Staphylococcus aureus, Mycobact. tuberculosis*). Sporulating

bacteria, e.g. *B. subtilis*, were able to germinate even after 45 minutes at 17,600 atmospheres.

Yeast sucrase, submitted to a pressure of 10,000 atmospheres for 30 minutes, loses 35 per cent. of its activity, but 45 minutes at 13,500 atmospheres completely inactivates the enzyme. A lactase lost 80 per cent. of its oxydase activity after 45 minutes at 13,500 atmospheres. Tetanus and diphtheria toxins behave somewhat similarly. 80 per cent. of the activity of diphtheria toxin is lost after 45 minutes at 13,500 atmospheres, but less than 1 per cent. remains after 45 minutes at 17,600 atmospheres. The toxicity of tetanus toxin is almost completely destroyed at 13,500 atmospheres. Cobra venom retains its full activity after 45 minutes at a pressure of 13,500 atmospheres.—W. R. WOOLDRIDGE.

OFFICIAL AND OTHER REPORTS.

NIGERIA. (1933). **Annual Report of the Veterinary Department for the Year 1931.** [HENDERSON, W. W.] pp. 27. Lagos: Government Printer. [fcp.] [2s. 6d.]

GENERAL.

The work for the year was chiefly characterized by greater intensity in the policy of active immunization against cattle diseases, which were thus brought under control with inconsiderable exceptions. Nearly 278,000 cattle were immunized against rinderpest, 386,000 cattle against blackquarter, 50,000 cattle against pleuro-pneumonia and 11,000 against haemorrhagic septicaemia. Inoculations against the first two diseases were performed simultaneously without trouble of any kind.

Owing to enforced economy practically no research work was carried out: BEATON, however, began an investigation into skin diseases of goats.

The position of the livestock and animal products industry is outlined. As elsewhere the year saw a depression in trade.

SPECIAL DISEASES.

RINDERPEST.—Several small outbreaks were reported, but these were not serious, the majority of cattle being immune. An attached schedule shows the numbers of inoculations performed since 1925. Mortality following double inoculation averaged 3 per cent.: this was considered to be due to piroplasmosis, either from a flare-up of latent invasion or a new infection transmitted by the rinderpest blood. Various procedures to check the latter were given an extensive trial and the following were found most suitable:—(a) the addition of a 1 per cent. solution of trypan blue to the virulent blood one hour before injection and (b) the use of rinderpest-infected goat blood instead of bovine blood in the double inoculation of cattle. One officer had good results when using goat rinderpest virus for infecting the bovine virus producer.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—By careful attention to cultural technique, the attenuated virus vaccine has reached a high level of reliability and is therefore much more in demand.

TRYPANOSOMIASIS.—Curative treatment on a large scale (8,886 cattle) was carried out, three to five weekly intravenous injections of 4 per cent. sodium or potassium antimony tartrate being found effective. Earth-eating is a constant symptom of bovine trypanosomiasis in Nigeria.

HAEMORRHAGIC SEPTICAEMIA.—This disease was more common than previously, some outbreaks involving a mortality of 3 per cent.

South African Horse Sickness.—This was reported in the Chad province, but not confirmed.

Diseases of Goats.—Skin diseases were studied and high incidence of demodectic mange (34 per cent.), streptothricosis (up to 50 per cent. in wet season) and goat pox was found.

Other Matters.—Reference is also made to the Stock Farm, feeding experiments with cotton seed and kalgo pods, ascariasis in calves, which was successfully treated by four weekly doses of one dram of oil of turpentine in 1 oz. of linseed oil, and ghee production.—J. E.

Nigeria. (1933). **Annual Report of the Veterinary Pathologist for the Year 1931.** [Hall, G. N.].—*Ann. Rep. Vet. Dept. Nigeria. 1931.* pp. 20-27.

Owing to the enforced cessation of research work, this section contains an account of the routine work performed—chiefly on diagnosis and vaccine production. Some original observations were, however, made.

Rinderpest.—(1) Shade-dried ox hides were found to lose rinderpest infection in 24 hours in the dry season and 48 hours in the wet season ; (2) spleens of rinderpest-infected cattle conserved their virulence for seven months if kept in cold storage, but lost their infectivity within four days at room temperature ; (3) fowls are not susceptible to rinderpest : they can, however, carry infection on their feet if placed among affected cattle ; (4) dwarf pagan cattle are particularly susceptible to rinderpest and should be given antiserum from beasts of their own breed in order to lessen the immunization mortality.

Contagious Bovine Pleuro-pneumonia.—The vaccine used during the year was a 90th generation of a strain from an ox broth peptone and horse serum culture. Work with a vaccine from the Sudan showed it to differ only in virulence from the Nigerian virus. In cross-immunization tests each protected against the other.

Trypanosomiasis.—Observations showed that *Trypanosoma vivax* does not cause illness in animals in good condition. Curatively tartar emetic and antimosan were found equally effective.

Haemorrhagic Septicaemia.—A formolized culture incubated for three days on horse serum broth was widely used (dose 2 c.c. subcut.).

Heartwater.—Inclusion bodies were found by Hall and considered to be rickettsia from cases that were diagnosed as " heartwater." Hall also confirmed the findings of Jackson (Onderstepoort) on the demonstration of rickettsia on the endothelium of the vascular system of affected sheep. Transmission by blood inoculation is regularly successful.

Demodectic Mange of Cattle.—Tartar emetic (intramusc.), carbolic acid (subcut.), potassium iodide (intraven.) and injections [route not specified] of castor oil were all found useless as curative agents.

Plant Poisoning.—Some preliminary experiments with the plant samberu gave inconstant results : it is sometimes toxic to cattle.—J. E.

Gold Coast Colony. (1932). **Report on the Department of Animal Health for the Year 1931-32.** [Stewart, J. L.] pp. 26. 4 tables, 1 map, 2 appendices. Accra : Government Printer. [fcp.] [2s.]

Staff.—One veterinary officer was retrenched for reasons of financial stringency, the coastal veterinary section being closed down although rinderpest had killed off some 10,000 head of cattle there in 1931.

The new veterinary station at Pong-Tamale was completed during the year, but was not put into operation for the production of rinderpest antiserum owing to illness of the veterinary pathologist. The station, which includes a laboratory,

a livestock farm and the veterinary training centre, is the new headquarters of the veterinary service.

Special Diseases.

Rinderpest is by far the greatest menace to the health of cattle. As a result, the cattle population has dropped by about 75 per cent. since 1900. Fresh outbreaks occurred during the year and were dealt with by segregation and antiserum, although there was a great shortage of the latter. The department's policy is to immunize actively all cattle, the young stock being treated annually. 26,000 cattle were immunized during the year by the antiserum and virus method. Antiserum was obtained from animals reacting clinically or thermally (fever) to the double inoculation, being drawn after about 20 to 40 days. Virus was first passed through goats before use, the desired object being to fix the virulence. Tests with spleen vaccine were begun.

Only one outbreak of bovine pleuro-pneumonia, causing 82 deaths, occurred during the year. Pleuro-pneumonia in goats and sheep also caused some losses.

Trypanosomiasis.—32 cases of *Trypanosoma vivax* infection in horses were noticed and 24 recovered after intravenous sodium tartar emetic treatment. Most cattle at the government farm became infected, but recovered after similar treatment.

Tsetse fly.—An experimental clearing away of bushes along some miles of river near Pong-Tamale gave very good results in the control of the fly as far as was evident during the year. *Glossina tachinoides* is by far the commonest species in the district.

Rabies was still present. No other disease gave much trouble.

Animal Husbandry.

The position is reviewed by the principal veterinary officer. There is considerable importation of livestock from French territory at the northern border. The estimated livestock census indicates 145,000 cattle, 684,000 sheep and goats, 87,000 pigs, 4,300 horses and 16,000 donkeys.

The report is provided with an excellent map specially marked to show features of veterinary and agricultural importance.—J. E.

Gold Coast Colony. (1933). **Report on the Department of Animal Health for the Year 1932-33.** [Stewart, J. L.] pp. 30. Accra: Government Printer. [fcp.] [2s.]

Staff.—During the year, the pathologist, one veterinary officer, one assistant and thirty cattle-patrols were retrenched in accordance with the general government plan of economy.

Financial.—The income of the department amounted to some £18,400, which is over £2,000 more than the expenditure.

Legislation.—Several amendments to ordinances were instituted in order to strengthen the rules in regard to immunization against epizootic diseases.

Veterinary Training.—The course for training African veterinary assistants has been made even more practical than before and lectures have been reduced to the absolute minimum. The reduction of staff has rendered a special teaching staff impossible, so that the students are trained largely by being attached to field veterinary officers. Special courses have been instituted at the livestock farm to train literate Africans in pig and poultry culture.

Organization.—During the years 1932 and 1933 the new Pong-Tamale station which was gifted by the Colonial Development Fund became fully open for work. At this station are the laboratory, the departmental headquarters, the

livestock improvement farm and the training centre. The full programme of work is being realised in spite of the fact that the European staff is one half of that proposed originally. The literate African personnel has been found capable of performing routine laboratory and other technical work which was not possible previously.

Quarantine Stations.—Trade through these stations has been almost unaffected by the economic slump, so short is the meat supply of the Gold Coast.

Disease Prophylaxis.—This year saw the completion of the initial immunization of the cattle of the Northern Territories against rinderpest. Within three years over 100,000 head have been treated, with a mortality rate of under 3 per cent. After the immunization of an area, the young stock are dealt with in every succeeding year and in this case the mortality has been found to run well below 1 per cent. This removes the menace of an epizootic, which has crippled the cattle industry since the end of last century. To effect this immunization, camps exist in each district which are visited periodically by an immunization unit under a veterinary officer, when the cattle to be treated are collected and brought to the camp.

A large clearing scheme to eliminate tsetse fly has been completed near Pong-Tamale, where fourteen miles of river has been cleared with the object of ridding a large tract of country from the menace of trypanosomiasis. Observations show very encouraging results and it is hoped that this method will be extended.

Veterinary Laboratory.—The primary function is the production of anti-rinderpest serum and vaccine. However, considerable research has been started and a beginning has been made to find what exactly are the enzootic diseases of the colony. Much progress occurred in spleen vaccine manufacture and this product gave excellent results in the field. The usual method is to give vaccine, followed a fortnight later by an injection of virulent blood to fix the immunity.

Classification of the ticks of the country has commenced and a preliminary list appears in the report.

Among protozoal diseases described are trypanosomiasis, piroplasmosis, anaplasmosis and theileriasis. Heartwater in goats and bovine contagious abortion have been found to exist.

Animal Husbandry.—The department deals with all the stock improvement and animal husbandry work in the Gold Coast. A full detailed description is given, showing all operations from experiments at the main government farm to the practical work in the field.—J. L. Stewart.

Fiji. (1932). **Report by the Senior Veterinary Officer. [1931].** [Turbet, C. R.] —*Ann. Bull. Div. Rep. Dept. Agric. 1931.* pp. 23-34. 3 tables. Suva: Government printer. [8vo]

The report is printed for the first time in its present form. The subject matter is contained under three parts headed Administration, Diseases of Animals and Animal Husbandry.

The duties performed by the veterinary staff include the administration of the Stock Improvement Ordinance, Animals (Contagious Diseases) Ordinance, and Foreign Animals Importation Ordinance. Advice is given on animal husbandry. Forty-three tours of inspection were made and 46,026 cattle and 6,134 horses, besides other animals, were seen.

Native Students.—Two new men were accepted for training as Native Stock Inspectors. These have been found adaptable and are becoming very useful.

Stock Improvement.—164 bulls and 11 stallions were licensed, 937 bulls

and 372 stallions were ordered to be castrated and 172 bulls and 83 stallions were castrated by inspectors.

Subsidies of £10 per head were paid to importers in respect of the importation of eight pure-bred animals.

Tuberculosis.—The number of clinical cases discovered did not vary greatly from the average annual incidence. An amendment was made to the Public Health Ordinance under which the control of registered dairies is vested. This provided for :—

(a) the making of regulations requiring cattle kept on registered dairies to be tuberculin tested ; (b) prohibiting the sale of milk from tuberculous cows ; (c) prohibiting the keeping of tuberculous cows on premises or pasture of registered dairies. Regulations were subsequently made and brought into effect.

Using the double intradermal test all cattle in registered dairies supplying milk to Suva were tested once. A synopsis of results is given in appendix A.

The assertion that Zebu cross-bred cattle are more resistant to tuberculosis than European breeds was not upheld, as is shown by the following figures :— European breeds 14·4 per cent. in 803 tested, Zebu-European crosses 20·8 per cent. in 72 tested. These were all from mixed herds. The regulations provided for the marking of tuberculosis-free cows with a metal ear tag. Reactors were fire-branded with a " T " on the left cheek. The disposal of reactors provides the greatest difficulty. For the time being, clinical cases are destroyed and the remainder held in isolation.

Fowl pox is a serious disease of poultry. Immunization by vaccination is carried out.

The attempt to eradicate the tick *Haemaphysalis bispinosa* failed and the campaign of eradication therefore ceased. Control measures were maintained to prevent the spread of the tick to other areas.

No fresh outbreaks of contagious abortion occurred. The activity of the disease was not marked.

Canine distemper occurred with great virulence. Commencing insidiously, the disease grew in intensity and swept through the entire canine population, high mortality resulting.

An epizootic disease of an acute infectious nature occurred among flying foxes, causing great mortality. This was concurrent with the canine distemper outbreak and the possibility exists that the same disease attacked both species.

Mastitis of cows, lantana poisoning of cattle, cancer, " foot-rot," parasitic diseases, mycotic dermatitis of sheep and poultry diseases are also discussed.

The position of beef production, dairying, pig, sheep and poultry raising is discussed under animal husbandry. The only one of these to make any advancement was dairying and the industry is becoming well established.

In appendix C is given a complete list of the diseases of animals recorded in Fiji.—C. R. Turbet.

Fiji. (1933.) **Annual Report by the Chief Veterinary Officer.** [1932]. [Turbet, C. R.]—*Ann. Rep. Dept. Agric. 1932.* pp. 38-47. 3 tables, 3 appendices. Suva : Government printer. [8vo].

The staff and their distribution remained the same as in 1931. Forty-four tours of inspection were made and 41,796 cattle, 6,639 horses, 5,775 goats, 1,361 pigs and 480 sheep were inspected.

Legislation.—The Stock Improvement Ordinance of 1909 was repealed and replaced. The new ordinance has certain clauses included which facilitate its application.

Stock Improvement.—Steady improvement in quality of local animals was dealt with :—93 bulls and 7 stallions were licensed, 573 bulls and 111 stallions were ordered to be castrated and 79 bulls and 42 stallions were castrated by inspectors.

No payment of subsidies to importers of pure-bred stock were made ; no importations of horses or cattle occurred.

Tuberculosis.—The number of clinical cases of this disease was greater than in previous years ; 267 cattle were destroyed. These were found chiefly in dairy herds which had not yet been tuberculin tested. The incidence of tuberculosis among tuberculin tested dairy herds, range stock and those of small Indian farmers and Fijians was lower.

The application of the tuberculin test to registered dairy herds supplying milk to Suva, certain government institutions and schools was continued. A synopsis of results is given in appendix B. Twenty-nine registered dairies were tested including 1,081 cattle with 9·35 per cent. reactors. 391 other cattle were tested with 20·48 per cent. reactors. Doubtful reactions caused less trouble than in 1931. These were usually found to be positive. The disposal of reactors is still causing concern.

The control of the tick *Haemaphysalis bispinosa* was continued. They have not increased in numbers and are not proving a menace to the cattle industry.

Other diseases dealt with are contagious abortion, mastitis of cows, lantana poisoning of cattle, actinomycosis, cancer, stephanuriasis of pigs, parasitic bronchitis of calves, gastro-enteritis of pigs, vaginitis of cows, tetanus, fowl pox, depluming mange of fowls, distemper of dogs, fish poisoning of cats and eye worm infection of fowls. No infectious diseases occurred in the quarantine station.

Animal Husbandry.—One of the most important functions of the Veterinary Division is guidance, particularly of the native and Indian population, in animal husbandry. Under this heading, beef production, dairying, pig raising, sheep and poultry breeding are also discussed.—C. R. Turbet.

Leslie, A. (1932). **Biannual Report, Canterbury Agricultural College, New Zealand. Veterinary Section. September, 1932.** pp. 15-18.

The author of the veterinary section of the report deals principally with diseases of sheep in Canterbury, where the college is situated.

(1) *Ante-partum* paralysis of sheep is stated to be due to a falling off in condition prior to lambing. The condition is successfully combated by improving the condition of the sheep. Fewer lambs are born dead as a result and fewer sheep succumb to *ante-partum* paralysis. A table is given showing a decrease in mortality from 7 per cent. in 1930 to 0·6 and 0·4 per cent. in 1931 and 1932 respectively under improved feeding conditions.

(2) Abortion in ewes was most marked where ewes were grazed for a prolonged period on turnips.—C. S. M. Hopkirk.

University of Reading. (1933). **Annual Report of the National Institute for Research in Dairying. Year ending July 31st, 1932.** pp. 77. 7 tables. [4to].

The report consists of two sections, the first merely giving a short general summary of the progress during the year along with a plea for more funds, while the second section comprises the reports of the various departments of the Institute. A successful year as regards the livestock is recorded. On July 31st there were 47 cows in milk, including heifers, and the average milk yield from 26 full-year

cows was 9,116 lb. All cows in the milking herd were examined by a veterinary surgeon at least twice in the year and the unhealthy animals were removed. Two tuberculin tests were carried out in October and April. Three in-calf heifers reacted to the October test, but in April all the cattle tested passed successfully.

A considerable amount of experimental work has been done which includes a study of typical English milk, inheritance of milk qualities, the causes of removals of cows from dairy herds and many other subjects of less interest to veterinary science. The Chemical Department shows many and varied activities, which include an investigation on the nutritive value of raw and heated milk, the dietary requirements for successful lactation, the vitamin content of type milk as affected by the season and the nutrition of the cow and an estimation of the vitamin A and of carotene. [By " type milk " is meant the mixed milk of a typical English herd, aliquot samples being blended daily from the morning and evening milkings in the proportion of two to three.]

The Bacteriological Department has carried out much useful work on milk and cheese, including the value of a coliform test for the efficiency of pasteurization. Probably its most important piece of work concerns the viability of the bovine tubercle bacillus in dung and on pastures, but so far the results of this investigation are not available.

Reports are also published on milk marketing, from the Dairy Bacteriological Advisory Department, the Physiological Department, the Dairy and the Library. A summary of 20 original papers, published by the staff between August 1931 and July 1932, concludes an interesting and instructive report.

—D. S. Rabagliati.

BOOK REVIEWS.

Henning, M. W. [Prof. Vet. Sci., Faculty of Agriculture, Univ. Pretoria]. (1932). **Animal Diseases in South Africa. Vol. I. Bacterial and Protozoal Diseases. Vol. II. Virus and Deficiency Diseases, Plant Poisons.** pp. xi and x + 878. 127 figs. [Numerous refs.] South Africa : Central News Agency, Limited. [8vo] [50s.]

Keen field observation commencing with the pioneering work of Dr. Hutcheon 50 years ago, and continuous research from the laboratory created by Sir Arnold Theiler early in the present century, have resulted in extensive knowledge of animal diseases in South Africa and a formidable volume of literature on the subject. But the literature is not easily accessible to the student of veterinary science and much of the information had not been summarized in book form. In this volume the author has undertaken the substantial task of collating the known facts and prevailing views, and although the execution is not free from blemishes he can claim to have provided the libraries with an indispensable reference book on diseases of peculiar interest to the African subcontinent.

The work comprises five parts. Part I deals with bacterial diseases and includes descriptions of diseases such as anthrax, tetanus, lamb dysentery, tuberculosis, glanders, etc., which are not peculiar to South Africa and on which the views of the author will therefore meet their due measure of criticism from European workers. Part II deals with protozoan diseases, including red water, gall sickness, East Coast fever, equine biliary fever, canine biliary fever, trypano-

somiasis, and spirochaetosis in swine. Part III deals with virus diseases including rinderpest, foot and mouth disease, lung sickness, " snotsiekte," three-day-sickness, sweating sickness, " blue tongue," " horse sickness," " heartwater," swine fever, African virus disease in pigs, canine distemper, rabies, and tick paralysis.

Part IV is devoted to diseases caused by poisonous plants, and the fact that it occupies 235 pages indicates the attention paid in South Africa to a cause of mortality relatively rare in Europe.

Part V is headed " deficiency diseases " but is really an addendum on " domsiekte " (pregnancy disease of sheep), the aetiology of which is still obscure ; " styfsiekte " (bovine osteomalacia), the most typical deficiency disease (aphosphorosis) of South Africa, is arbitrarily dealt with in part IV along with " crotalism," a different form of " styfsiekte " (stiff-sickness) attributed to plant poisoning.

The matter is attractively presented, the illustrations are good, a suitable index is provided and the references given at the end of each chapter constitute a useful bibliography. It would not be difficult to point to unevenness of quality, and to single out debatable statements, ambiguities of expression, significant errors and obvious misprints (e.g. p. 43 and p. 722), but the criticism to which the work is open in its present form can easily be obviated in a later edition. The task undertaken was not a light one and the author is therefore to be congratulated upon what he has accomplished rather than criticized for human imperfection.

—H. H. Green.

Berland, L. [Sous-Directeur du Lab. d'Entomologie au Muséum National d'Histoire Naturelle de Paris]. (1932). Les Arachnides (Scorpions, Araignées, etc.) Biologie systematique. [**The Arachnida (Scorpions, Spiders, etc.) Systematic Biology**]. pp. 485. 634 figs. [Numerous refs.] Paris : Paul Lechevalier et Fils. [8vo] [Fr. 150].

This monograph forms volume 16 of the *Encyclopédie entomologique*. It is devoted to the Arachnida, dealing at the greatest length with spiders, to a less degree with scorpions, and still more briefly with the Acarina and Linguatula. Each group is dealt with under the three aspects of morphology, biology and classification. Of morphology and classification only the briefest essentials are given, whereas the biology of each group is treated more fully, more than 200 pages being devoted to the biology of spiders. There is one chapter on the geographical distribution of spiders and one on what is known of fossilized Arachnida.

The book is obviously written by one who is fond of the subject and proves most interesting reading for anyone at all interested in biology. It is copiously illustrated, nearly all the illustrations being drawn by the author. There is also a comprehensive bibliography at the end of each section and the subject matter has been well indexed for the convenience of the reader.—J. S. Steward.

Henderson, J. [Curator of Univ. of Colorado Museum], & Craig, Elberta L. [Museum Assistant]. (1932). **Economic Mammalogy.** pp. x + 397. 11 tables. [Numerous refs.] London : Baillière, Tindall & Cox. [8vo] [22s. 6d.]

A book of this kind has almost unlimited scope ; animals form such an essential part of our food, clothing, household goods, sport and pleasures that the title covers a good part of the economy of the world and the 400 pages could have been filled in many different ways.

Henderson and Craig have produced a book which is packed with information on the relations of mammals to man and his property, to soil, insects, birds, fishes, the legislation concerning them, the damage they do and the means of control. It is divided into two approximately equal parts, the first dealing with the various aspects of the subject in a general way, and the second dealing with all the mammals systematically and mentioning in greater detail their useful or harmful activities, their feeding habits, the value of their skins, the amount of destruction done by some of them, such as rodents, and the record slaughters of such animals as bison and seals.

More care might perhaps have been taken in seeking expert advice in certain special branches of the subject : thus in the chapter on " Diseases and Parasitism of Mammals " one reads that " Foxes on fox farms are subject to a number of diseases, such as mange, diarrhoea, constipation, worms, indigestion, tuberculosis, kidney disease and intestinal abscesses," and in the chapter on " Mammals as Disease Carriers " that " tapeworms are disseminated by wild Carnivora, and probably by domesticated species."

The 26 pages of references which appear at the end appear to be a needless duplication as they have already appeared in the extensive footnotes, but in conjunction with the text they should prove of great assistance to anyone who is unfamiliar with any branch of economic mammalogy and takes up this book as a guide to the numerous branches of a very extensive subject.—E. L. TAYLOR.

VON BERTALANFFY, L. (1933). **Modern Theories of Development.** [Translated and adapted by J. H. Woodger]. pp. x + 204. [93 refs.] London : Humphrey Milford. [4to.] [8s. 6d.]

This book, which is based on the author's " Kritische Theorie der Formbildung " published in 1928, does not claim to present new facts. It was written in an endeavour to arrive at a theoretical biology as a completely developed science analogous, for example, to the science of theoretical physics. For this purpose, the more important current theories of biology and the numerous biological facts already known are clearly expounded and analysed.

The first part of the book is concerned with general biological considerations. It is pointed out that a crisis has been reached in biology, due to the rapid accumulation of facts without clear theoretical laws acceptable to a natural science with which to clarify them. The controversy between mechanism and vitalism is reviewed and it is shown where each of these theories of life breaks down. The author also considers that the physico-chemical explanation of the single phenomena in the organism does not suffice for the foundation of a theoretical biology, as it fails to establish laws to explain the arrangement or organization of material processes. It is further suggested that the most exact knowledge of its ingredient materials and processes is insufficient for an understanding of life.

The second part of the book deals with one aspect of biology only, namely, that of development. Again an attempt to explain development on current theories meets with failure. In place of these the author puts forward the " system theory." This regards the organism as a whole, as a unitary system, and development as a function of the whole and not as a sum of cell actions. Moreover, a specifically biological type of organization must be recognized in systems capable of development and this is not reducible to any form of physico-chemical " gestalt " (configuration). The author formulates two purely biological laws, the law of biological maintenance (the organic system tends to preserve itself) and the law of hierarchical order. In conclusion it is pointed out that the chief task of biology in the future

is to establish laws of biological systems and to remove the prejudices which stand in the way of the recognition of biology as an independent science.

—J. A. NICHOLSON.

CLAY, H. H. [F.R. San.I., F.I.S.E., Fellow of Sanitary Inspectors' Ass.] (1933). **The Sanitary Inspector's Handbook.** pp. xx + 386. 93 figs. London: H. K. Lewis & Co., Ltd. [8vo] [15s.]

This is a new edition of the well-known "Taylor's Handbook." Clay has brought it up-to-date as far as possible, for laws and regulations are always being amended, e.g., in this edition the Imported (Foods) Regulations are already out of date, due to the Amendment Regulations which came into operation in September, 1933.

For the veterinarian the chapter on dairies, cowsheds and milk-shops is very useful as it contains concisely the laws and regulations, also good diagrams on cowshed construction, ventilation and sanitation.

The chapter on meat inspection is very brief but useful, the diagrams are crude and should have been reproductions of original photographs with the lymphatic glands spotted in. The deep inguinal lymph gland is shown. This, in bovines, is generally absent.

It is perhaps not too much to state that no one better than Clay could have been selected to edit this book for he writes with theoretical and practical knowledge of the work.

Having read the book carefully, we cannot do better than endorse the words of Professor JAMESON in his introductory chapter :—

"The book will prove most helpful to all students preparing themselves for the Sanitary Inspector's and similar examinations, and will in addition be found a valuable work of reference in public health departments."

We would add that the same remarks apply to all veterinary officers connected with any public health work and especially students preparing for the D.V.S.M. examination.—**T. DUNLOP YOUNG.**

GUNN, J. A. [M.A., M.D., D.Sc., F.R.C.P., Prof. of Pharmacology, Univ. Oxford, and Fellow of Balliol College]. (1932). **An Introduction to Pharmacology and Therapeutics.** pp. viii + 237. London: Humphrey Milford. 3rd edition. [8vo] [5s.]

Apart from the addition of short sections on liver extract and vaccines and slight revision so as to comply with the new pharmacopoeia, the third edition of this book follows closely the form and arrangement of the second edition. The drugs are divided according to their mode of action in the body and special reference may be made to the section dealing with drugs acting on the autonomic nervous system. The book in no way claims to be exhaustive and only the more classical examples of drugs are described in each group, but none the less a very useful purpose has been served by reducing the subject matter to the minimum without any serious omissions.

This book was written with the primary object of assisting students of human medicine and therefore the use of drugs in human ailments is alone considered. It does not necessarily follow that because a drug acts in a particular manner in man, it will have the same action in a domestic animal. Drugs, however, cannot be applied scientifically to remedy disease in any animal, unless their fundamental physiological action has first been understood and appreciated. Further, as

knowledge extends and many new drugs are added to those already in use, it becomes inevitable that the science of pharmacology should be pushed further and further into the background and that of therapeutics take its place. This state of affairs tends to make the use of drugs mere impiricism, which cannot be permitted in the scientific treatment of disease. For these reasons, since a clear account of the pharmacological action of drugs is given, this book well repays study by all students of veterinary medicine who wish to understand the basic principles underlying the action of drugs.—J. A. NICHOLSON.

GARNER, W. [M.Sc., F.R.M.S.] (1932). **Industrial Microscopy.** pp. vii + 389. 208 figs., 8 tables. [Numerous refs.] London : Sir Isaac Pitman & Sons, Ltd. [8vo] [21s.]

According to the author, " the main object of this book is to present in one volume an adequate number of these methods of microscopic technique of general interest to the technical chemist " and, to a veterinarian whose interest lies mainly in chapters dealing with microscope and microbiologic technique, the author appears to have done this very creditably.

The book consists of 17 chapters, including chapters on the structure and use of the microscope, methods of measurement, counting and drawing, microbiological technique, bacteria, fungi, sewage and water, etc. A concise account of the essentials of photomicrography is also given. The chapters on bacteria and fungi are devoted chiefly to classification and occupy 54 pages in all.

It is well illustrated and a useful bibliography is appended to each chapter. The book is of a convenient size and the matter is very well presented. The publishers' work is in keeping with their usual high standard.

—GWILYM O. DAVIES.

MACNAUGHTEN, Lettice. (1932). **Pistol *versus* Poleaxe. A Handbook on Humane Slaughter.** pp. xxv + 577. 94 figs., 58 plates, 5 tables. [7 pp. of refs.] London : Chapman & Hall, Ltd. [8vo] [21s.]

This book has been written as a plea for the humane slaughter of all animals used for butcher's meat, by first stunning them by means of some mechanically operated instrument. At the present time, when all local authorities in England and Wales are studying the Slaughter of Animals Act, 1933, which becomes operative on January 1st, 1934, the work is of especial interest.

After a foreword by Viscount LEE OF FAREHAM and a preface by Professor R. G. LINTON, the book opens with a series of chapters on the methods of slaughter of cattle, sheep, pigs and calves, dealt with separately from all possible angles. Chapters are also included on slaughterhouses, slaughtermen, the Jewish and Mohommedan methods of slaughter, and a most complete summary of the Acts of Parliament and by-laws in Great Britain and Ireland bearing on the subject is included.

Although the authoress has devoted years of her life to the improvement in methods of slaughter, she has also been scrupulously fair in incorporating innumerable references to the works and opinions of those who have strenuously opposed her views. Not only this, but she has devoted several pages of her book to lists of accidents which have been caused by or attributed to mechanical killers.

A detailed account of many of the slaughterhouses in Great Britain and even of some abroad is given, both public and private, good and bad, and numerous excellent illustrations of several of these are reproduced. The appalling conditions

which still exist in some of our slaughterhouses in England today are clearly depicted, but by no means exaggerated.

Practically every page contains a reference to the opinion of some private individual or corporate body dealing with the point under view, and, if it is permitted to criticize, it would seem that too many separate opinions are given, some doubtless of but little value, so that the reader is likely to become wearied and even perplexed by so much detail.

The book is excellently printed and the 59 plates, most of which are from actual photographs, are vividly reproduced. It is a book that should find its place on the shelves of every veterinarian, medical officer, sanitary inspector or even layman interested in the question of meat production, for it contains a mass of information concerning the slaughter of meat animals such as has never been included previously under one cover.

The fact that the Slaughter of Animals Act, 1933 [England and Wales], is coming into force, is the best proof of the value of the propaganda which the authoress has set out to describe in these pages.—D. S. RABAGLIATI.

KAUPP, B. F. [B.Sc., M.S., D.V.M.] (1933). **Poultry Diseases.** pp. 444. 168 figs., 1 table. London : Baillière, Tindall & Cox. [8vo.] [18s. 6d.]

In the preface to this, the sixth edition, the author states that the book commenced with 185 pages and in this there are more than 400 pages. Material has been added to the previous edition and the remainder revised, but one would be glad to see still more revision to bring the work thoroughly up to date.

Whilst not wishing to be destructively critical, one must object to the suggested treatment of sick fowls. Often treatment is quite contra-indicated. To quote coccidiosis as an example, treatment is recommended both for birds affected in the chick stage and the older stock. There is no product, chemical or otherwise, which has been proved to be efficacious in the treatment or prevention of this condition.

Regarding the agglutination test for the detection of the presence of *Bact. pullorum*, it has not been found that it is necessary for the birds to be in lay before the test is carried out. Treatment again is quite contra-indicated. Under gross lesions, it is stated that the liver is usually yellow. This condition is physiological. There is as yet no proof of the statement that fowl typhoid passes through the egg.

The nomenclature of fowl pox and roup is not given with our present knowledge of the disease. The comb and mouth lesions have been proved to be caused by the one virus of fowl pox. Diphtheritic roup is illustrated and described as manifested by lesions in the mouth. The illustration shows these to be mouth lesions of fowl pox. It is regretted that no reference is made to the pigeon pox virus vaccine which has been used successfully for many years in most countries of the world.

Chapter XXIII, " Poultry Remedies," might be deleted with advantage. The indiscriminate use of drugs by lay persons in treating diseased birds is one of the causes of the spread of disease.

The book is well illustrated and the publishers are to be complimented upon their part of the production.—NORMAN DOBSON.